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Chemical Week

Turmoil in rubber industry. New processes, products tangle outlook . . . . . p. 22

Cheaper citric? Short-cycle, deep-fermentation process nears commercial test . p. 36

Enzyme research opens new medical, industrial markets; sales set record highs . . p. 73

Aluminum sulfate prospect: good. Papermaking is strong spur to demand . . . . p. 85

Pinpointing Germany's chemical targets . p. 90

December 5, 1959

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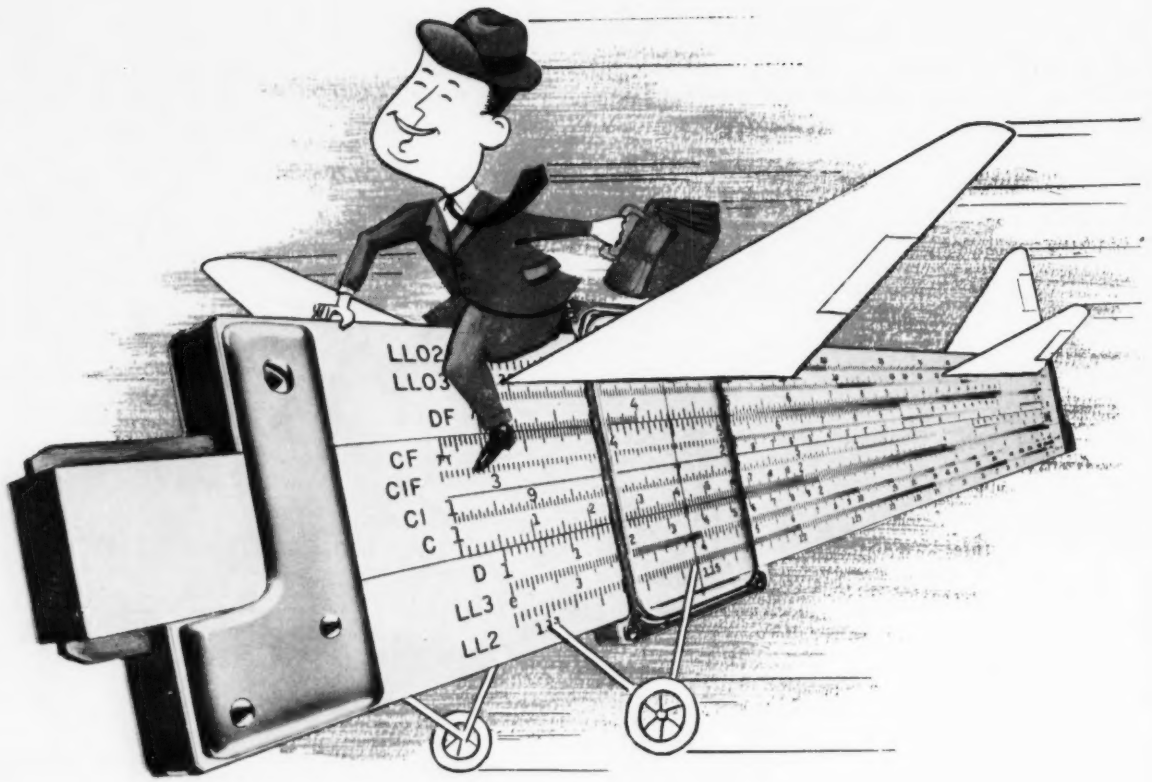

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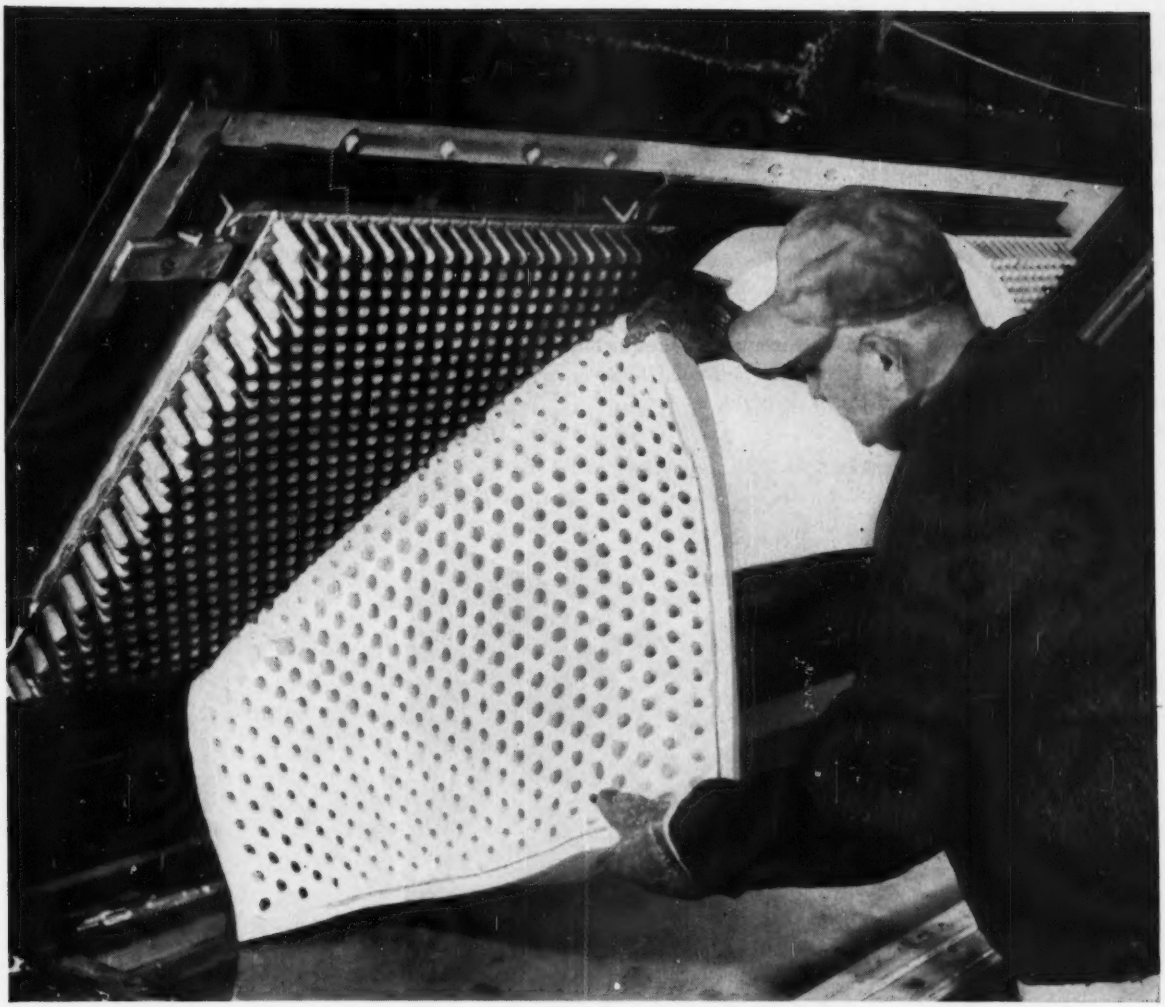

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Chemical Week

TOP OF THE WEEK **DECEMBER 5, 1959**

- **Underscoring interest in foreign chemical investments:** MCA's new international operations committee ..... **p. 25**
- **CIL invades U.S. paint market,** move may foreshadow increasing Canadian interest in U.S. operations ..... **p. 45**
- **Easy-to-apply epoxy coating upgrades electrical insulation,** helps reduce switchgear failure ..... **p. 53**
- **GAF's new pigment-selling push** is powered by reorganized sales staff, research-trained management ..... **p. 61**

14 VIEWPOINT
Spokesman for FMC—Kirkpatrick Award winner—explains his firm's view of management's basic tasks.

17 BUSINESS NEWSLETTER

22 Hotter competition ahead in rubber. Industry is trying to cash in on synthetics, new processes.

24 Prospects for '60: Chemical companies' latest dividend payments and sales statements reflect industry optimism.

24 Plant-safety crackdown looms in Japan as government probes explosives plant blast.

25 MCA sets up special international operations group, headed by Oronite's Ted Hughes.

31 WASHINGTON NEWSLETTER

36 ENGINEERING
Bzura Chemical begins shakedown of new short-cycle, deep-fermentation citric acid process.

45 SPECIALTIES
Canada's second biggest paintmaker goes after U.S. markets. Here are its objectives.

53 PRODUCTION
Westinghouse launches epoxy coating for upgrading switchgear insulation.

61 SALES
General Aniline divorces pigment sales from dye sales, keys pigment sales push to research.

69 TECHNOLOGY NEWSLETTER

73 RESEARCH
How research is boosting clinical and industrial enzymes sales.

76 Statistical study relates R & D budgets to changes in business climate. CPI-significant results.

81 MARKET NEWSLETTER

85 MARKETS
Heavy demand for paper products hikes production of aluminum sulfate toward sales of 1 million tons next year.

90 ADMINISTRATION
New data show West Germany's chemical export strength—clue to future target areas.

91 BASF's chief, Carl Wurster, says he's only a "tourist" in U.S.

92 SOCMA reports on newest successes of its low-budget aid-to-education program.

98 BUSINESS BENCHMARKS

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No. 23
Vol. 85

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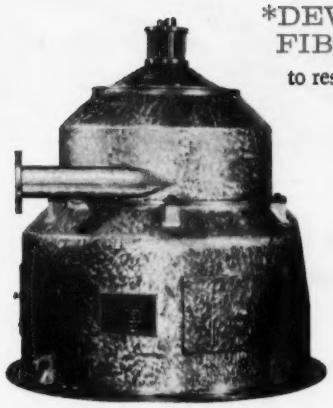

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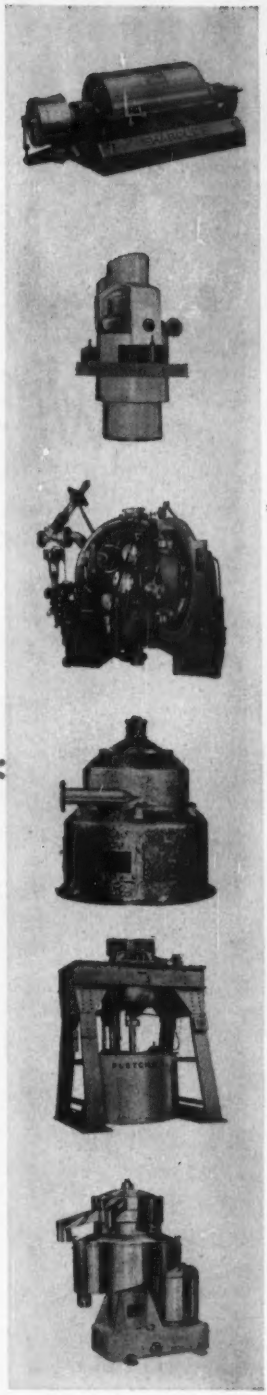

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Textile Technology in Chemical Engineering

Fiber selection and its importance in filtration

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Each of the many fibers has its own peculiar attributes to fulfill the different filtration requirements.

The natural fiber, cotton, offers the advantages of bulk, plus the high wet strength especially important in filtration. It is a relatively low cost material.

Filter press cloths made of filament yarns such as nylon have a slick, smooth surface for greater ease in cake discharge. Nylon also has excellent caustic resistance and outstanding physical properties.

Acrylic fibers have a high degree of acid resistance, good strength, and resistance to other chemicals and destructive organisms such as mildew and bacteria.

The characteristics of these and many other fibers are strong considerations in making the proper choice. All their properties, however, do not necessarily carry over automatically into the finished fabric. Fabric performance, regardless of fiber, is finally determined by the actual construction of the cloth.

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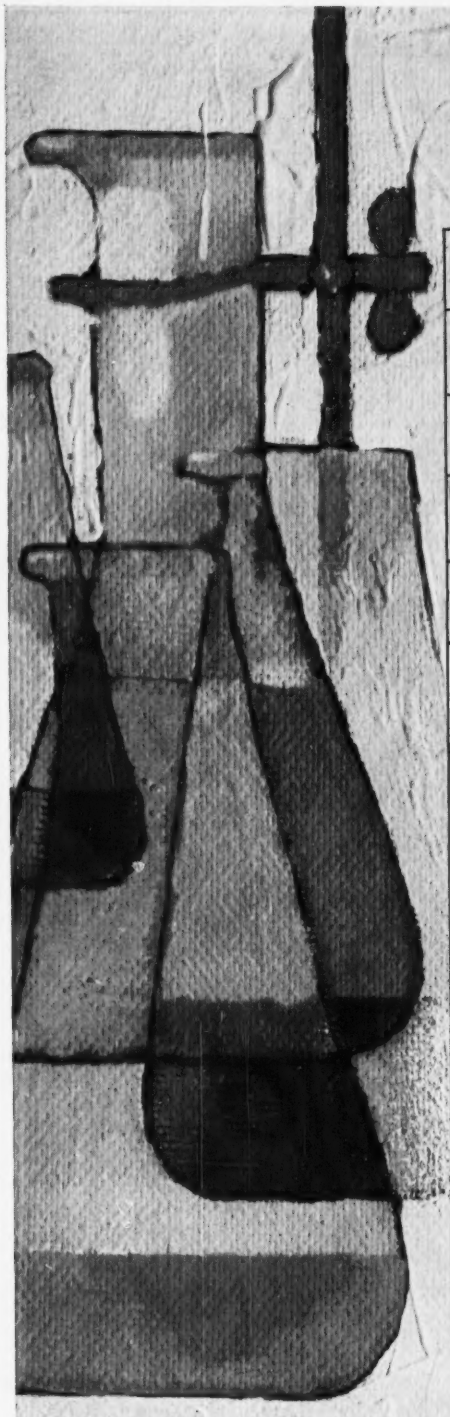
Progress of this sort highlights FMC's policy of planned diversification in three primary fields: **Basic Chemicals, Industrial and Agricultural Machinery, and Military Defense Materiel.**

For complete listing of our products and services, contact FMC, Dept. PRA, Box 760, San Jose, California.



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fmc	**Chemicals and Plastics Division:** Organic chemicals, plasticizers, plastics, allylic and epoxy resins and chemicals
FAIRFIELD CHEMICALS	**Fairfeld Chemicals:** Basic chemicals for formulators of household and commercial pesticides
Niagara	**Niagara Chemical Division:** Insecticides and fungicides; weed killers; industrial sulphurs
Westvaco CHEMICALS	**Westvaco Chlor-Alkali Division:** Alkalis, chlorine, chlorinated solvents, carbon bisulfide, soda ash
Westvaco CHEMICALS	**Westvaco Mineral Products Division:** Sodium and potassium phosphates, phosphoric acid, barium and magnesium chemicals, sodium sulfide
Chicago	**Chicago Pump Company:** Sewage and industrial waste treatment equipment
fmc	**FMC Packaging Machinery Division:** Filling, packaging, and paper box machinery; bag makers; wrapping machines; paper and film converting equipment
J. BEAN	**John Bean Division:** Industrial high-pressure reciprocating pumps
PEERLESS PUMPS	**Peerless Pump Division:** Complete lines of centrifugal pumps for CPI
fmc	**Packing Equipment Division:** Drum and case automatic handling and warehousing systems
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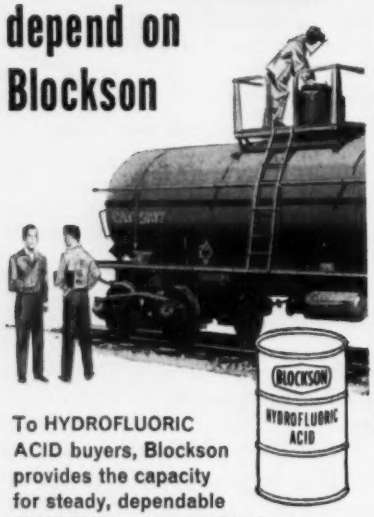

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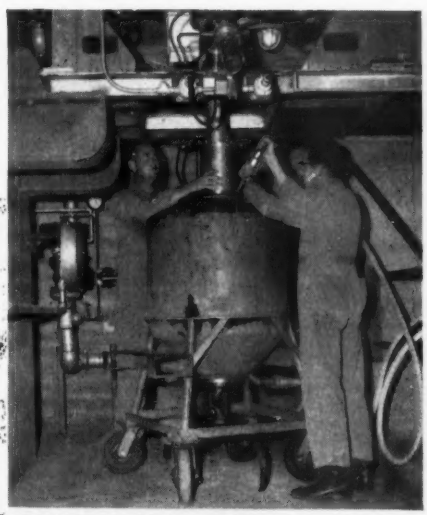

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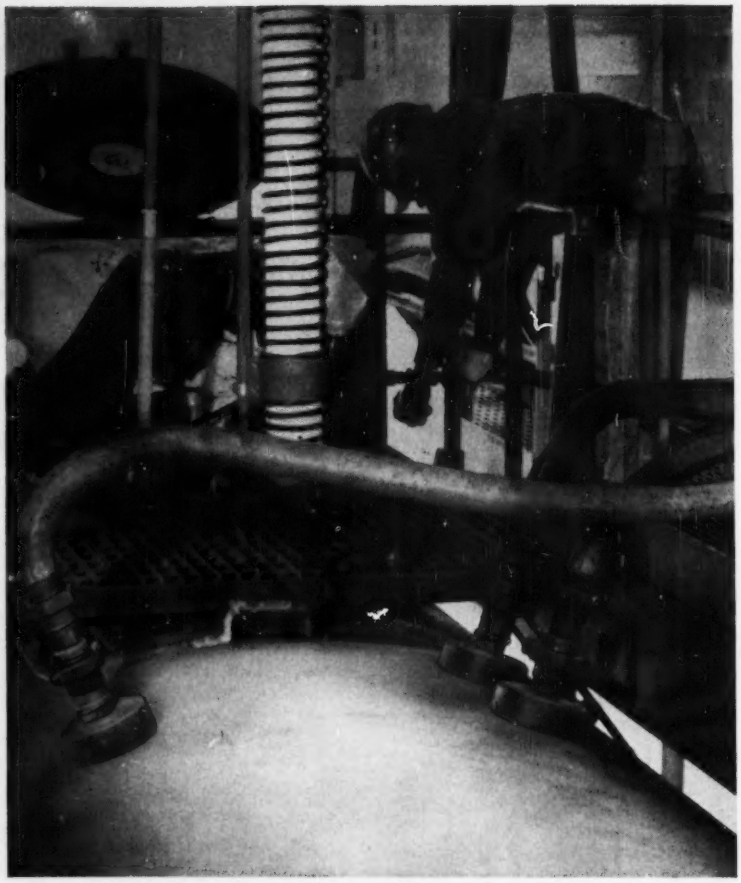

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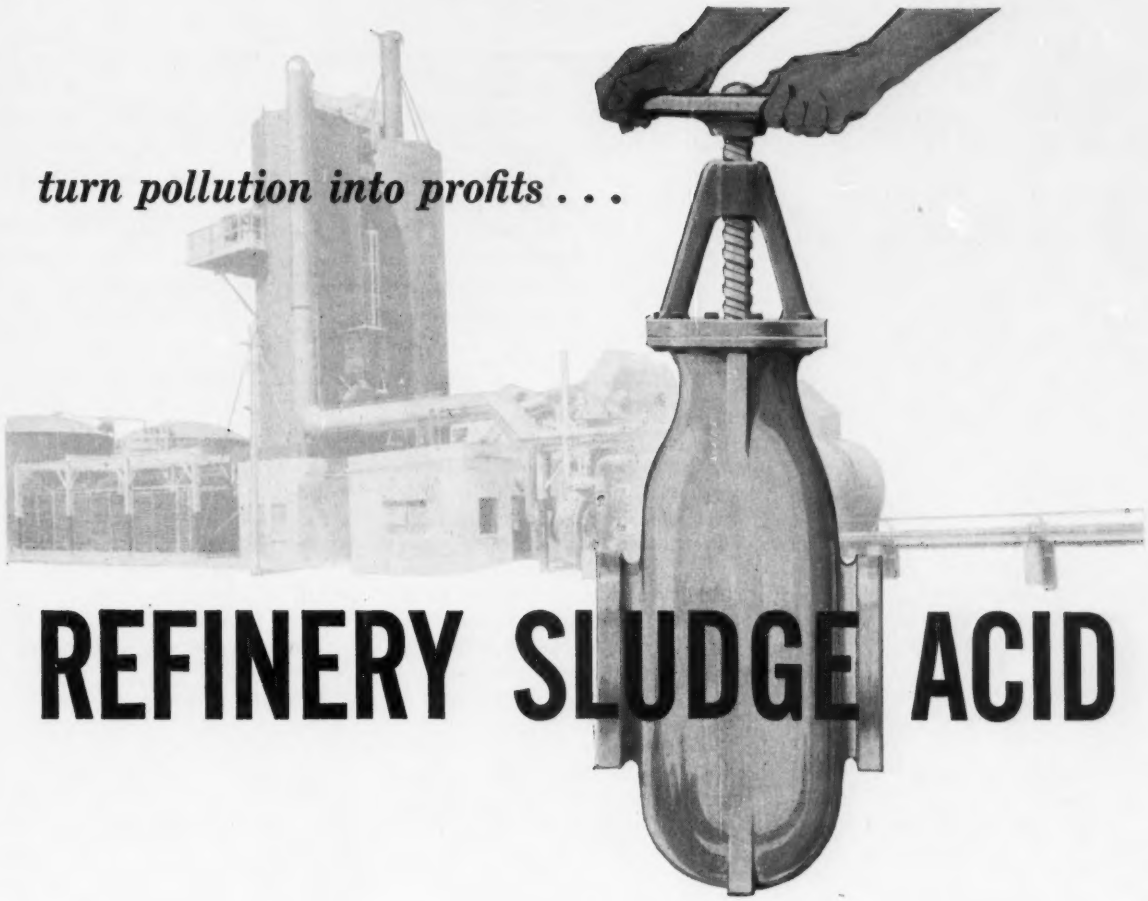

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Today, Chemico-built plants are profitably producing 4000 tons of regenerated sulfuric acid per day – 75% of the U. S. total. In addition, Chemico is now constructing a new regeneration plant which will be the largest single-unit sulfuric acid plant of *any* kind in this country. When you are ready to turn a pollution problem into a profitable operation, Chemico's experience can pay important dividends.

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VIEWPOINT

Management's task is threefold: It must plan for achievement; it must achieve the goals; it must distribute the "spoils." But management often delegates this threefold task improperly.

So said Carl Prutton, Food Machinery and Chemical Corp. executive vice-president, in accepting this week the first Kirkpatrick Award for Management Achievement, presented to FMC by CHEMICAL WEEK:

THE ACCOMPLISHMENTS on which a major management award is based can never be made by an individual, or even by several individuals. Broad achievements in business can be attained only by the cooperative efforts of large groups of well-organized personnel with high morale.

Management has three main areas of action in which to achieve its goals:

First, in planning and organizing for achievement.

Second, in achievement.

Third, in distributing the "spoils" of achievement.

It has been my experience that in too many cases in modern industry, the first and third of these phases are neglected by top management or delegated to lower-echelon personnel. In my opinion, such complete delegation of these functions is incorrect.

The first aspect of management is most significant because without adequate planning and proper organization, achievement in the modern business world is almost an impossibility.

In building an organization, one fact not too well recognized is that many men of modest attainments have tremendous capabilities for development. Lord Beveridge has stated that one of the prime purposes of an organization is to "make common men do uncommon things."

However, to develop these latent talents requires not only proper training, but also a willingness on the part of top management to offer these men full opportunity for demonstrating their capabilities. It is my belief that a boss should be more of a leader and teacher than a judge or executioner.

In an organization geared for today's rapidly changing business, one must develop great flexibility in his men. These men must be thoroughly indoctrinated to constantly expect and aggressively meet these rapidly changing conditions. Only in an organization with highest morale can such spirit be engendered. Management's work is cut out in this area. Upon its shoulders rests the primary responsibility for setting the stage for achievement.

The second area, that of achievement, has somewhat different responsibilities. Many executives seem to spend most of their efforts in carrying out the details of the plans developed for achievement. It follows that if proper planning and organization for achievement are made, the task of achievement itself should follow smoothly.

In most cases, it is possible to delegate almost completely such activities to one's subordinates. It requires a hard-hitting, coordinated team to carry out business planning to a successful conclusion. Through proper planning, achievement can be attained by highly skilled subordinates properly selected and trained during the organization stage.

The third area, the distribution of "spoils," is also an area that many executives appear to neglect or dispose of as expeditiously as possible, or handle on the spur of the moment. The "spoils" may be commendations, criticisms, advance in position; or salary, bonus or stock option rewards. The thought given to this area should almost equal that of planning, for the future of your business depends upon the proper motivation of your younger men with latent abilities. These men should be encouraged by adequate and proper rewards and recognition.

Therefore, management must carefully weigh the presentation of rewards for good performance, and distribute them with full equity to all deserving people.

Most people in industry, although vitally interested in economic gain, are largely concerned with receiving equitable recognition for their creditable roles in a business success. They also like to belong to a winning team, having a bunch of good, warm-blooded leaders and teammates, and a minimum of internal strife.

When failures or near failures occur, top management must be very meticulous in its behavior. Under these conditions there is a natural tendency to have a "witch hunt" and find some "goat" on whom the failure can be blamed.

This procedure should, of course, be rigorously avoided, since a real manager should assume all responsibility for all failures. Unless this is true, every man of intermediate stature tries to avoid working on difficult problems that might fail, or tries to get away from problems that have been started and which look as though they are going sour. It is always "darkest before the dawn" in the chemical development business, and management needs from its personnel that last push to put over and complete a successful project. Hardly any project looks 100% certain to succeed all the way through its history.

Our organization is accepting this award with the proper mixture of pride in its past achievements; humility, since it has had such an unusual opportunity to demonstrate rapid improvement; but mainly in confident dedication to the many problems of constructive growth and improvement that lie ahead of all vigorous members of the American chemical industry.

Aerosol packaging captures 51% of the $73,900,000 cologne market

If your product can be brushed, poured, sprayed or squeezed, this profitable new packaging idea can generate sales for you, too!

Sales of aerosol-packaged colognes reached $37,600,000 in 1958—51% of the $73,900,000 total spent on colognes—and they're still increasing at a rate of over 20% a year.

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If you don't know the name of a custom filler, write Du Pont. We'll send you a list and include survey data on your market for aerosol products, plus information about Freon* propellents for aerosols. "Freon" is preferred by custom fillers and is used in more of today's aerosols than any other propellent. Write E. I. du Pont de Nemours & Co. (Inc.), "Freon" Products Div. 3312, Wilmington 98, Delaware.

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- **15 mils thick—one coat**
- **Conventional spray equipment**

Use your present equipment to spray 100% resin solids in applications of up to 15 mils thick on a flat or vertical surface! Sounds impossible? It was . . . until Shell Chemical developed two new Epon resin curing agents, H-1 and H-2.

Curing agents H-1 and H-2 assure unusual working pot life while retaining all the many desirable film properties of Epon resin. Humidity does not adversely affect the performance of formulations using H-1 and H-2 . . . in fact, a small amount of moisture is actually desirable.

This "revolution in surface coating techniques" means that you can apply heavy coats of tough, durable, corrosion-resistant Epon resin as easily as you now apply a coating containing solvents. That's *really* big news!

GET IN ON THE GROUND FLOOR of this important new development by contacting your nearest Shell Chemical district office right now. Write or phone the one nearest you. Ask for complete information on Epon resin curing agents H-1 and H-2.

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IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited, Toronto

Business Newsletter

CHEMICAL WEEK
December 5, 1959

The pharmaceutical industry won a major victory last week in its running battle with the government over pricing policies. Judge Phillip Forman dismissed the Justice Dept.'s criminal antitrust suit against the five Salk vaccine producers (*CW, Oct. 24, p. 28*), holding that "there is no evidence in the case higher than a suspicion." The government will not be able to appeal the decision because it was a criminal suit.

A pivotal factor in Forman's decision was the "most favored customer" clause in the companies' contracts with the Dept. of Health, Education & Welfare. This guaranteed to H-E-W prices equal to the lowest charged to state agencies. Its inevitable result, Forman said, was to "ensure uniformity."

•

The West Coast will get its first methanol plant: Hercules Powder is planning to construct an 8-million-gal./year methanol plant on its Hercules, Calif., plant site near Richmond. Also planned: a 50-million-lbs./year formaldehyde unit and an 11,000-tons/year plant for urea-formaldehyde compositions.

Completion of the urea-formaldehyde unit is targeted for mid-'60; the methanol-formaldehyde facilities are to be onstream early in '61. Already being produced at Richmond: industrial explosives, anhydrous ammonia, ammonium nitrate and solutions, urea and solutions, and nitrogen tetroxide, an oxidizing agent for rocket fuel.

Largest current outlet for methanol on the West Coast: in the making of resins for particle board and plywood adhesives.

•

Political pressure appears to be a factor in the boron fuels situation, with the Air Force being prodded almost daily by Congressional delegations from New York and Oklahoma.

The Air Force now confirms that it has asked for, and received, new bids from Olin Mathieson and Callery Chemical on production of boron fuels (*CW Business Newsletter, Nov. 28*). It would thus seem that the Air Force is thereby disregarding the recommendations of the Arthur D. Little report—that the Callery plant at Muskogee, Okla., be kept on a "hot stand-by" basis and that the Olin Mathieson plant at Model City, N.Y., be closed down and locked up.

But a USAF spokesman—Assistant Secretary Joseph Charyk—maintains that the Air Force feels it is complying with the recommendations of the Gunness joint military service panel in seeking the best possible offers from the competing companies.

•

You can expect more ventures into the U.S. by foreign firms. Courtaulds and Canadian Industries Ltd. have revealed plans for new oper-

ations in this country (*see also p. 45*). Montecatini is building a $10-million polypropylene plant at Neal, W. Va.

And now another Italian giant—Snia Viscosa—is stepping into the U.S. in a big way. Franco Marinotti, president of the big synthetic fiber and chemical producer, is now in the U.S. wrapping up a set of joint ventures. On tap: four separate production ventures, each with a different U.S. company. And with one of these companies, plus a fifth U.S. firm, Snia is planning to put up two more chemical plants in Europe. In still another move, Snia will build a caprolactam plant in Italy, using its own process. It will supply approximately half of its need for nylon-6 production.

•

Are the Steelworkers in a more conciliatory mood this week?

This question arises from the union's three recent settlements with Union Carbide. It's pertinent because conversations among steel industry, union and government officials are being held this week in an effort to get an agreement before the end of the 80-day injunction against the steel strike.

In the new settlements, signed between Nov. 19 and 28, the Steelworkers backed down on two of the principal demands for which they had been striking: retention of the cost-of-living wage escalation clause, and multiplant bargaining.

The Steelworkers—representing a total of not quite 1,000 employees at three plants of Union Carbide Metals Co.—had been on strike since expiration of three-year contracts at Ashtabula, O. (July 13), Portland, Ore. (Aug. 15), and Sheffield, Ala. (Nov. 1). The three new contracts call for dropping the escalation clauses but "freezing in" the various sums accumulated under these clauses under the old contracts; no change in supplemental unemployment benefits (SUB), or in contract termination dates; a 9¢/hour across-the-board wage increase; and wage reopeners on anniversary dates. The new contract at Portland runs to '62; the two other pacts end in '61.

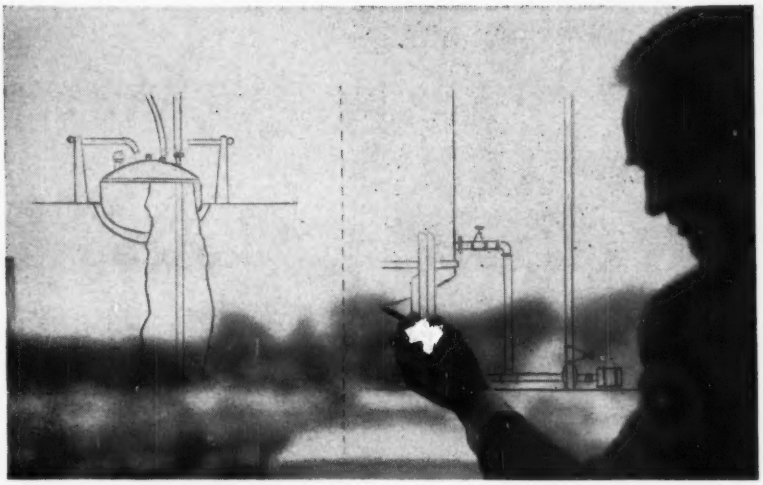
•

Lithium Corp. of America is buying into the rocketry field. It will take over Fulton-Irgon Corp. (Dover, N.J.), which works on propellent systems and propellents as well as other missile and aircraft components. Fulton-Irgon has applied for patents on solid-propellent systems based on various metal hydrides (including lithium hydride), but its biggest product line at present is cartridge-actuated valves for rockets.

LCA is expected to issue long-term, convertible debentures in exchange for all outstanding Fulton-Irgon stock; and Fulton-Irgon—founded in '56—will operate as a division of LCA. Its present backlog is reported at more than $500,000, and management says its '60 sales will be substantially more than that.

BRIEFS

on a useful manual on handling caustic soda . . . phosphorus chlorides for organic synthesis . . . a special plasticizer for vinyl plastics



Caustic soda handling from tank car to process

An authoritative study of this subject is covered in our *Caustic Soda Engineering and Handling Guide*, a 40-page manual designed for engineers.

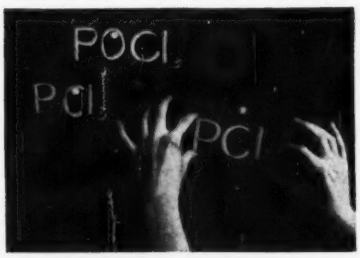
This manual puts at your finger tips the essentials on handling and storing liquid caustic soda, with emphasis on safety, efficiency, and minimum contamination.

It includes:

- Detailed diagrams of equipment for unloading, diluting, and storing.
- Commonly used methods of unloading tank cars.
- Materials of construction.
- Safety precautions and first aid.
- Graphs and tables on such properties as dilution temperature, vapor pressure, viscosity, and specific heat.

Check coupon for a copy.

Three phosphorus chlorides for organic synthesis



If you're ever looking for commercial quantities of versatile intermediates for introducing phosphorus and/or chlorine into an organic, check back on this family of Hooker phosphorus chlorides:

Phosphorus oxychloride. A clear, water-white liquid, typically 99.8% pure. Only 0.01% phosphorus trichloride. No free chlorine or phosphorus pentachloride. Iron at less than 1 ppm.

Phosphorus trichloride. Also a clear and water-white liquid. 99.9% pure. No free phosphorus.

Phosphorus pentachloride. Often used in pilot work and other areas where only small quantities are involved. Not only more reactive than the trichloride, but offers the convenience of a powder form for use in small reactors. No phosphorus trichloride or nickel. 1 ppm lead. 2 ppm iron.

For more data, check coupon.

Formulators of polyvinyl chlorides take note...

We offer for your perusal a bulletin which can help you improve vinyl compositions in five different ways. Count them. Impart flame retardance. Get higher resistance to water, oil, and gasoline. Get high permanence on heating. Get high tensile strength joined with high flexibility. Lessen migration.

The source of these many improvements is our MPS-500® plasticizer.

MPS-500 is a *stabilized* chlorinated ester of a fatty acid. It finds use, primarily with other plasticizers, in vinyl films, upholstery, drapery, electrical insulations, and shoe soles.

MPS-500 is completely compatible with the polyvinyl chloride polymers in ratios as high as 60 parts per 100.

For more facts, send the coupon.

For more information check here and mail with your name, title, and company address:

- ☐ Caustic Soda Manual
- ☐ Caustic Soda Data Sheet
- ☐ Phosphorus Oxychloride Data Sheet
- ☐ Phosphorus Pentachloride Data Sheet
- ☐ Phosphorus Trichloride Data Sheet
- ☐ MPS-500 Bulletin

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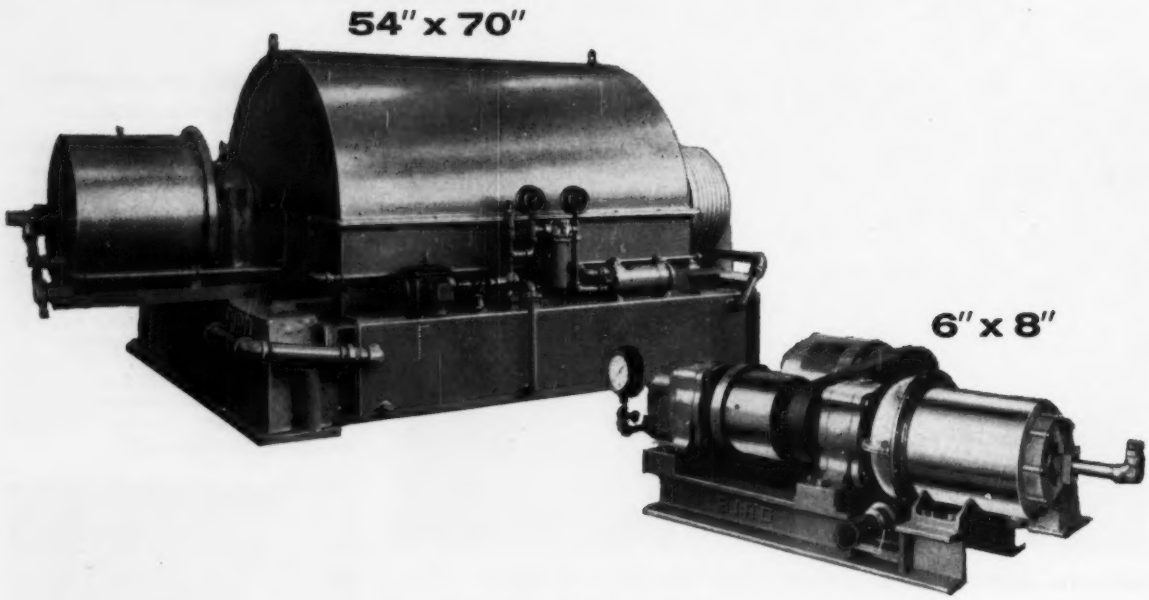
What's the Right Size BIRD *for* YOUR *solid-liquid separating job?*



The Bird Continuous Centrifugal with 6-inch dia. bowl is ideal not only for experimental work but for production when volumes are relatively small.

The Bird with 54-inch dia. bowl delivers well dried solids at rates up to a ton or more per minute.

In between are sizes to match almost any volume or process requirement.

But more important than size or capacity is the fact that this Bird effects the separation in a fast, clean way — through effective use of positive, powerful centrifugal force — no cloths, no vacuum, no filter media, no auxiliaries. Operation is continuous, automatic, low cost. Maintenance expense seldom exceeds a penny or two per ton.

With the Bird you don't fit your job to the machine. You fit the Bird to the job. The Bird Research and Development Center is equipped to help you select, by pilot-scale test, the one best size and design (there are 25 variations) to do the best job for you at the lowest cost.

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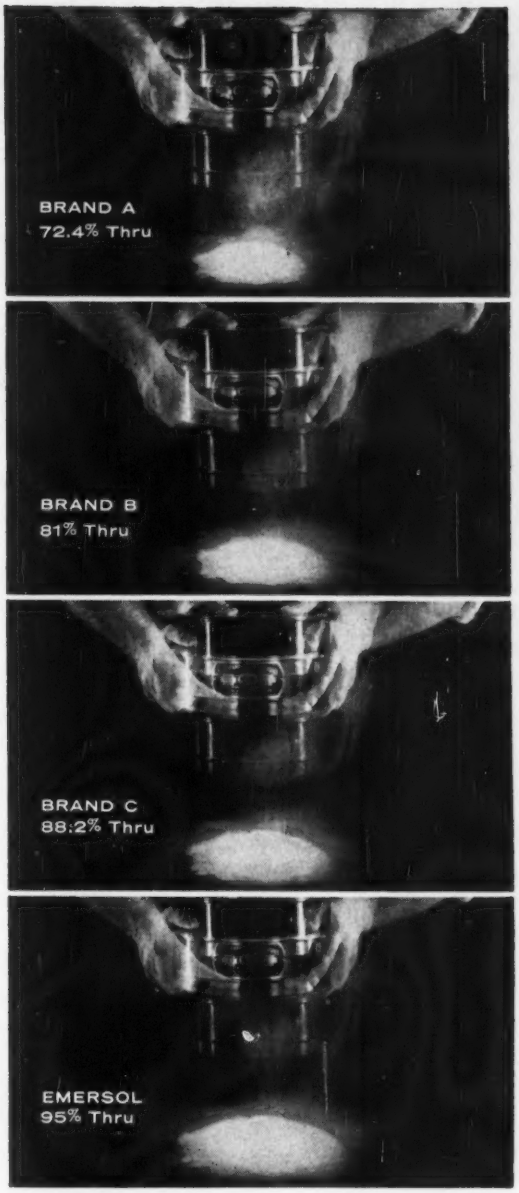

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Thanks to an advanced powdering process, Emery can provide you with the very finest and most uniform powdered stearic acid available. And, the word "finest" applies not only to particle size but also to basic quality and purity.

Why has Emery alone developed powdered stearic to such a high state of perfection? Simply because we do not regard this product as a low-volume "nuisance" business, but rather as a specialty product whose performance is so very important to quality-conscious users. We even go so far as to provide special packaging in 50-lb. specially lined multi-wall bags, which provide maximum protection against contamination and facilitate handling.

Why not obtain the special advantages of Emersol Powdered Stearic Acid for yourself? For evaluation samples of Emersol 132 Lily (T.P.), Emersol 120 (D.P.), Emersol 140 (70% palmitic) and Emersol 150 (80% stearic), or literature on the complete line of Emersol Stearic Acids, write Dept. I-12.

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Chemical Week

Rubber Industry Gears for Big

Major rubber companies this week are firming their 1960 capital budgets, readying for a sharp production challenge in the year ahead. Operating rates will rise to about 80% of capacity—highest since 1955—to meet the expected surge in demand. Accordingly, nearly two-thirds of the industry's anticipated $233-million capital outlay is earmarked for automation and modernization.

Brisker business will bring problems. Over the next five years, production of synthetics—particularly the "synthetic natural" types—will have to be substantially boosted to offset the limited supply of natural rubber (*chart, right*). And manufacturing bottlenecks, particularly in tiremaking, must be broken.

That the industry is rising to the challenge is evident.

Phillips Chemical (Bartlesville, Okla.) has just completed plans for increasing *cis*-polybutadiene capacity to 200,000 lbs./month. For the past year, this "*Cis*-4" has been in semicommercial production and under evaluation as a replacement for natural rubber, especially in truck tires. It will be used primarily as a natural rubber extender.

Shell Chemical's 20,000-tons/year polyisoprene plant at Torrance, Calif., is scheduled for completion next year. Polyisoprene is a "synthetic natural" with a molecular structure similar to that of natural rubber.

Firestone Tire and Rubber is completing its $15-million Orange, Tex., Coral "synthetic natural" plant. Goodyear and Goodrich-Gulf are moving ahead with "synthetic natural" projects of their own, although neither will discuss progress at this time.

Esso will soon be marketing its modified butyl rubber produced at Baton Rouge, La.

Gates Rubber (Denver, Colo.) has just started up its new $9-million tiremaking plant at Madison, Tenn. This plant, which boasts an electronically controlled masterbatching operation, is as fully automated as today's technology permits.

Job for Synthetic: Synthetic rubber will have to take the brunt of the anticipated rise in rubber usage. World consumption of synthetic rubber is expected to double, from 2 million to 4 million long tons/year, in the next decade. Natural rubber output will stabilize at about 2 million long tons/year.

Indonesia—now supplying about 36% of the world's natural rubber needs—is reported to have replanted less than 10% of its rubber-growing acreage since '45. Widespread replanting would take at least seven years to yield new rubber.

Although Malaya, by contrast, is vigorously replanting, and output from Africa should be a reality in the next 10 years, experts hold that this new production will only offset the Indonesian production decline.

Frank Schoenfeld — research vice-president of B. F. Goodrich—says the U.S. will have to boost its synthetic-to-natural new rubber ratio from 65% to nearly 80% within five years to meet its own rubber demands. To accomplish this, Schoenfeld holds, synthetics with natural rubber characteristics must become available on a large scale.

Competition Stiffens: Twenty-three companies are now making and marketing about a dozen major types of synthetic rubber. There are more than 150 distinct types of styrene-butadiene rubber (SBR) alone. And quality improvements are qualifying SBR for competition even in the truck-tire field, where higher-priced rubbers have been the rule.

Butyl rubber—seriously threatened when tubeless tires appeared in '54—is gaining acceptance in high-priced "smoother ride" passenger car tires, now marketed in 18 Eastern and Southern states. But it has gained most in wire and cable cover, automotive extrusions and specialty applications. Projected increase in consumption of butyl through '65 is now set at about 7%/year.

Significant sales gains also are predicted for neoprene. Neoprene recently has been substituted for natural rubber in tire whitewalls—a new market for the former. The improved nitrile types, however, are claimed to have neoprene's weather resistance, plus good color stability—new competition for neoprene in the specialty field is the likely upshot.

Impact of Newcomers: By '65, both polyisoprene and *cis*-polybutadiene are expected to play sizable roles in the total supply-demand situation. Still in development are ethylene-propylene copolymers, tailored for the tire market.

Meanwhile, imports of both rubber products and products having rubber components are increasing both in volume and in competitive impact.

Squeeze on Hand Labor: Transportation uses of rubber now account for about 63% of U.S. rubber consumption. Despite great strides in rubber preparation and curing during the past few years, major rubber companies are still seeking to reduce hand labor in one intermediate step—building the tire.

U.S. Rubber says its 480-tires/hour machine, which promises to cut production work forces by as much as 60%, is still in the testing stage. A company spokesman says the machine is still not ready for the production line. Other companies are also known to be working on automated tire-building equipment.

But a processing improvement expected to have significant impact in the '60s is the Rotomill (U.S. Patent 2,894,280, assigned to B. F. Goodrich Co.), a new mixing and extruding machine. It was described at the Washington rubber convention as "the first practical device for achieving continuous operation with . . . susceptibility to automation. . . ." The machine is expected to find use in a variety of rubber compositions, in-

Push in '60

cluding the newer polymers.

Masterbatch Moving Ahead: A trend with long-range implications is masterbatching of polymers. Masterbatching is not new—initiated as early as '51, according to United Carbon Co. (Charleston, W. Va.). But interest is mounting as a result of cost savings and advances in product quality stemming from improved new methods of dispersing black rubber in SBR plants. Eleven companies now produce 130 masterbatches of all types (49 oil, 81 black).

Retread Growth: One of the biggest growth areas in the '60s will be the retread market.

According to estimates recently compiled by Longmile Rubber (Dallas), an independent producer, 500 million lbs. of tread rubber will be used next year, a 12% increase over '59 consumption. And in '63, it's predicted, 550 to 610 million lbs. will be consumed.

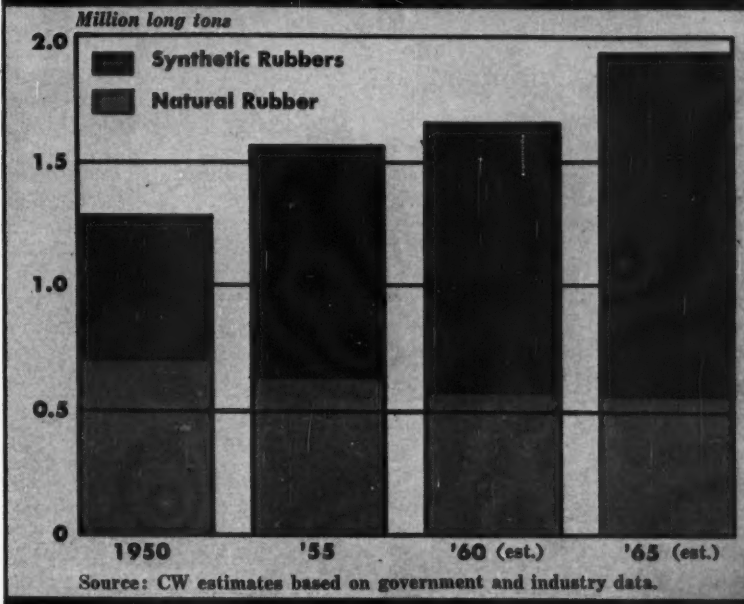
Chewing up ever greater quantities of tread rubber: superhighways, smaller wheel diameters, automatic steering and power brakes.

And while transportation uses are rising, other applications are expected to mount even faster, climbing from 37% to 45% of the total rubber market by '70.

Roads Converge: George R. Vila, group executive vice-president of U.S. Rubber, strongly believes that the rubber industry's future lies in polymer chemistry. One road has led to neoprene, nitrile, SBR and stereo-regular ("synthetic natural") polymers; another to phenolic, polystyrene and other plastics. Now, he says, the two roads are converging, with the rubber industry encompassing a broad spectrum of polymers among which the "line between rubber and plastics eventually will disappear."

But as the two roads converge, competition will become even hotter. And it's a good bet that capital budgets will keep right on rising as new hurdles inevitably present themselves.

New Rubber Consumption in the U.S.



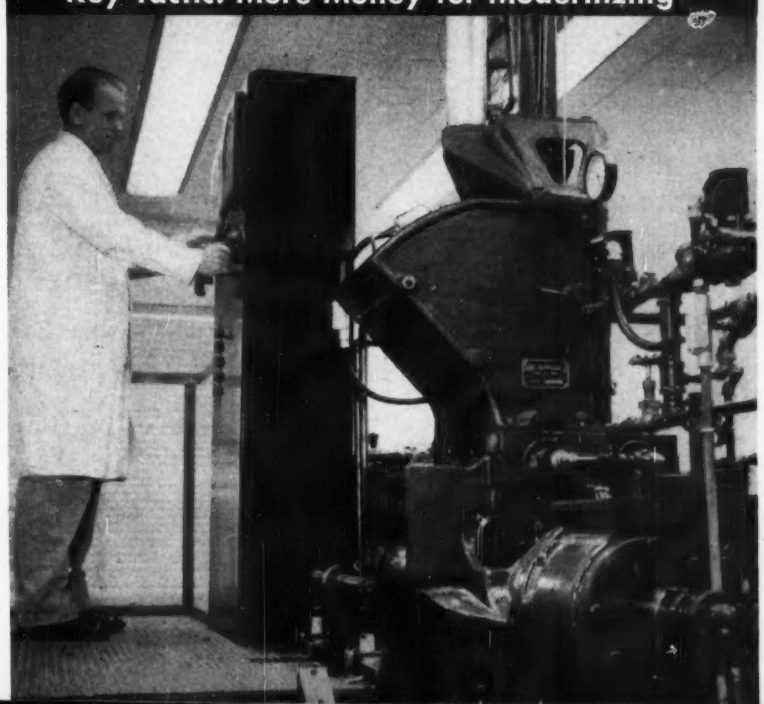
Source: CW estimates based on government and industry data.

Synthetic Rubbers' Prospects For Growth

Actual and predicted U.S. consumption, in long tons

	1955	1965	Change
SBR (rubber plus oil)	741,997	1,020,000	37.5%
Butyl	53,991	90,000	66.7%
Neoprene	72,876	100,000	37.2%
Nitrile	26,035	45,000	72.8%
Stereo-regular	.....	125,000	...
All synthetic rubbers	894,899	1,380,000	54.2%

Key Tactic: More Money for Modernizing



Omens for Optimism

Chemical industry management's currently confident mood is implicit in the flock of recent corporate moves to increase and add dividends. And further evidence of industry's resounding good health appears in financial data from various late-reporting companies.

Latest declarations of increased, extra and year-end cash dividends on chemical companies' common stock make it almost certain that this year's payout will be significantly greater than the previous peak of $925.7 million in '57.

In the first 10 months of this year, cash dividend payments by makers of chemicals and allied products amounted to $718.8 million, up 4.4% over the corresponding period in '58, according to last week's report from the U.S. Dept. of Commerce. Few companies pay dividends in November, but the December payout—traditionally the heaviest of the year—will be substantially swelled this year. For instance:

- Du Pont is making its year-end dividend $2.50/share, so that total common-share dividends this year will be $7, versus $6 last year.
- Hercules Powder will pay a 55¢/share year-end dividend Dec. 23, making this year's total payout $1.30, compared with $1.10 last year.
- Metal & Thermit Corp. last week boosted its regular quarterly dividend rate to 30¢/share. That had been the regular rate until last year's recession, when payments were lowered to 20¢/share.

Comfort from Drugs: And a number of pharmaceutical companies are doing more for their stockholders this month: Merck has raised its regular quarterly dividend from 35¢ to 40¢/share and is paying a 20¢ extra dividend; Smith Kline & French will pay a 25¢/share extra; and Norwich Pharmacal has proposed a two-for-one stock split.

Cheerful Statements: Latest financial statements all reflect a continuing high level of business activity in all chemical fields.

Smith-Douglass, producer of fertilizers and chemicals, increased sales 29.6%, to $9.5 million, in the first quarter (July-September) of its current fiscal year; and earnings shot up 72.6%, to $645,922.

In the fiscal year ended Sept. 27, Foster Grant's sales rose 28%, to $29.3 million, and net earnings bolted 71%, to more than $1.7 million.

Stepan Chemical's nine-month sales were up 16.2%, to $12.8 million (including operations of Maywood Chemical Works since the May 1 merger); but earnings slipped 7.1%, to $607,545, because of price cuts in several major products and startup expenses.

Nine-month sales and earnings were both up more than 16% for Chemetron Corp.; totals were $97.8 million and $3.2 million (exclusive of nonrecurring items), respectively.

Reichhold Chemicals elevated nine-month sales 31%, to $71.1 million, but net income dipped 5.4%, to $2.45 million. RCI said this was due to a strike, tornado damage, expansion costs, and material shortages.

Chemical Process Co. (San Francisco) reports nine-month sales up 33.8%, to $3.9 million, and earnings up 55.6%, to $258,480.

Walter Murphy Dies

Walter J. Murphy, career editor and a well-known figure in the U.S. chemical industry, died last week at the age of 60.

At his death, Murphy was editorial director of the American Chemical Society's applied publications.

After nine years in industry, Murphy launched his editorial career in 1930, when he became managing editor of *Chemical Industries*, the predecessor of CHEMICAL WEEK. He became editor and manager in '40, moved to ACS in '43 as editor, *Industrial & Engineering Chemistry*.

Murphy took on several jobs for the government during his career. After World War II, he studied Germany's chemical industry advances for the Joint Chiefs of Staff; observed the Bikini atomic bomb tests as a technical representative; served on AEC's Advisory Committee on Technical Information; and as a consultant to the Army Chemical Corps.

Safety Problem's Violent Proof

A stepped-up drive for plant safety in Japan may result from last week's explosion at Toyo Chemical Industry Co.'s explosives plant in Yokohama. The blast killed three, injured 384, destroyed 25 plant buildings and damaged 1,000 other buildings within one-mile radius from the plant. Authorities suspect the plant might have been working with more explosives than was legally permitted, or that workers mishandled the 736 lbs. of TNT and other explosives believed to be stored there. Japan has only 34 explosives plants, but during the first six months of '59 alone there have been 261 explosives mishaps. Government officials and explosives experts attribute the rising accident rate to violations of safety laws.

Trade Split in Europe?

The signing of the seven-nation European Free Trade Assn. treaty marks the beginning of a critical new period in European trade relations. What follows will have a major impact on U.S. chemical processors' plans for building in Europe and on the fate of U.S. exports.

Starting in July, each FTA member (United Kingdom, Denmark, Sweden, Norway, Switzerland, Austria and Portugal) will cut tariffs 20% on goods from the other six nations. It's the first of a series of cuts designed to result in tariff-free trade within the group by 1970. Unlike the European Economic Community (the "Common Market" — France, Germany, Italy, Belgium, Netherlands, Luxemburg), FTA will not have a common outside tariff wall.

The Big Question: The long-awaited birth of FTA raises a resounding question: Will it lead to a free-trade agreement between the two western European blocs — as its prime movers originally hoped — or does it mark the beginning of a schism that will rupture European trade relations, trigger a new wave of protectionism, and severely weaken the North Atlantic Treaty Organization?

Last week, the Common Market members made a gesture toward averting such a split. They agreed to extend to outsiders the 20% increase in import quotas they have scheduled for Jan. 1. This won't mean much, because through GATT they are already committed to knock down quantitative import restrictions. The more important question of outside tariff cuts they put off until next year.

Meanwhile, the threat of a split is being heightened by pressure within the Common Market for a speedup in reaching its free-trade goal.

FTA tariff cuts are timed to ease coordination with the Common Market program. But now Belgium proposes that EEC's timetable be shortened so that free-trade goals may be attained by '65 instead of '70; Italy wants to slash tariffs 50% during the first four years of the transitional period; and France would like internal tariffs to be cut by 20% next June, instead of the planned 10%, also wants its low-tariff partners to speed up scheduled boosts in tariffs against outsiders.

Oronite President Hughes: For international problems, global orientation.

Taking a Global View

One of the principal current trends in the U.S. chemical industry — the growth of international operations— was underlined twice last week at the Manufacturing Chemists Assn.'s ninth semiannual meeting, which drew a record 1,120 registrants to New York's Statler Hilton Hotel.

In his report on the state of the industry and of the association, MCA President John Hull noted the "phenomenal increase in overseas operations by American chemical firms" during the past year. [The chemical industry's overseas capital expenditures totaled $178.5 million in '58 and may reach $203.5 million this year, McGraw-Hill's recent survey showed (*CW, Aug. 15, p. 25*).]

To help meet the problems arising from the industry's new global orientation, Hull said, MCA has set up an International Operations Committee — "one of the most important actions that has been taken by the association."

The 18-man committee is headed by T. G. Hughes, president of Oronite Chemical Co., and includes other companies' top-ranking executives for international operations. This new unit — the 28th of MCA's technical and functional committees — will deal with matters such as foreign operations and foreign tariffs. Domestic tariffs will continue to be handled by MCA's long-standing International Trade and Tariff Committee.

Opportunities and Problems: Members attending the panel on international chemical operations — the first such panel held by MCA — got a good look at the kind of problems the new committee will grapple with. Hughes served as moderator.

In his talk on the chemical opportunities and problems in Europe, Donald Brophy of Rohm & Haas discounted the advent of the European "Common Market" as the main reason for the surge of U.S. companies into Europe. Even without the Common Market, he said, Europe is growing fast enough to attract new industry. U.S. exports will suffer not primarily because of tariffs but because the expanding and integrating European industry will need lesser amounts of chemicals from this country, and will offer stiffer competition in third markets.

South America is another promising spot for U.S. chemical industry investment, Borden Chemical Co.'s director of international operations, John O'Connor, told the meeting. Right now, the chemical market is small, he said, but a company holding off until the market grows large enough to support a U.S.-scale plant is likely to be shut out by some other company that got there first.

J. R. Turnbull, a consultant, said foreign private investment in Japan is difficult but can be rewarding. The Philippines is "the most promising country in southeast Asia"; Formosa and Thailand have high potential; Korea is "an unlikely area" for large-scale chemical investment. He warns against investing in Indonesia, Vietnam, Laos and Cambodia.

The Home Front: Domestic problems also got a good working-over by the MCA members. Some of the big areas pinpointed by Hull:

- After a long-term downtrend, the industrial injury rate of MCA member companies started climbing in last-quarter '58, has risen 18%.
- Companies grappling with the problem of complying with the Food Additives Amendment of 1958, which goes into effect next March, will soon have help from a food additives manual now being prepared by MCA.
- Prospects are promising that the rising costs of tank-car ownership will be relieved by an increase in railroads' compensation rates.

COMPANIES

Colgate-Palmolive Co. (New York) and Lakeside Laboratories (Milwaukee) have worked out a merger agreement that would put Colgate into the ethical drug business. The plan calls for Colgate to issue about $13 million worth of stock, to be exchanged on the basis of one and one-quarter shares of Colgate stock for each share of Lakeside stock outstanding. Lakeside—a 35-year-old producer of prescription drugs used for treatment of heart disease, mental depression, anemia and asthma—had sales of more than $6 million in '58.

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Alaska Lumber & Pulp Co. (Sitka, Alaska) has been test-running its $60-million pulp mill, expected to have a capacity of 120,000 tons/year. Most of the output will probably go to Japanese rayon and pulp interests.

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Sun Chemical Corp. (New York) has purchased for cash Facile Corp. (Paterson, N.J.), manufacturer of coated and laminated films and fabrics, industrial and decorative tapes, and special materials for U.S. Navy projects, atomic energy installations and high-altitude experiments. Current fiscal year sales are expected to run close to $5 million.

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Asbestos Bonding Corp. (Napa, Calif.) has been acquired by The Clute Corp. (Littleton, Colo.), diversified manufacturing and development concern. Clute President John Lowell says his company has installed a pilot plant for air separation of asbestos fibers and plans to expand production from 100 tons/day now to 1,000 tons/day by next autumn.

EXPANSION

Films, Packaging: Chippewa Plastics Co. (Chippewa Falls, Wis.) division of The Rexall Drug and Chemical Co., has purchased Package Containers, Inc. (Salinas, Calif.), and set up a West Coast packaging division. Under new management, the division will cover the whole range of flexible packaging: film, foils and cellophane, bags and overwraps of all types, and heavy-duty bag and drum liners.

•

Petroleum Products: British American Oil Co. (Toronto, Ont.) will build a $3-million alkylation unit for high-octane gasoline production at its Clarkston refinery. Capacity: 3,000 bbls./day of motor alkylate. Completion date: June '60.

•

Phenol: Dow Chemical has obtained options on some sites and is studying other possible locations for its proposed phenol plant in the Pacific Northwest (*CW Business Newsletter, Nov. 28*). Dow says it will spend several million dollars on property development and plant construction before operation of the 36-million-lbs./year unit begins, early in '61. Other facilities will be added over a period of several years in building up "an integrated chemical and plastics manufacturing operation to produce chemical materials important to the region's growing economy."

•

Nitrogen Fertilizer: North Dakota Nitrogen Co. (Bismarck) is conducting a survey to find a site other than Riverdale, N.D., for a proposed nitrogen fertilizer plant. Meanwhile, further research is being carried out on feasibility of using lignite as a source of hydrogen. The scheme is based on availability of a 2-million-ton stockpile of lignite.

FOREIGN

Pharmaceuticals/Switzerland: The former head of Searle's European Research Div., William Konigsberger, has set up his own company, Kingshill Pharmaceuticals Inc. (Zurich), to market newly developed pharmaceuticals in Switzerland and Germany. Associated laboratories will sell Kingshill products under joint labels in France, Italy, Spain and Scandinavia. The company also plans to act as a licensing agreement clearing house, locating new European drugs and establishing research contracts for U.S. firms.

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Fertilizer/Malaya: Standard Vacuum has filed a proposal with the Malayan government for construction of a fertilizer plant and oil refinery.

•

Oxygen, Ammonia/Yugoslavia: L'Air Liquide, manufacturing affiliate of American Air Liquide (New York), has won a $1.6-million contract to build a low-temperature gas separation plant for Yugoslavia. It will be financed by the U.S. Development Loan Fund. Capacity: 100,000 tons/year oxygen, 120,000 tons/-year ammonia synthesis gas.

•

Polyethylene/Russia: Imhico, one of the members of West Germany's Imhausen group, will supply a $35.6-million polyethylene plant to the U.S.S.R.

•

Chemicals/Italy: Italy boosted chemical exports to $160 million during the first nine months of '59, compared with $128 million during the first three quarters of '58. Exports of fertilizers almost doubled to 900,788 metric tons; synthetic rubber, plastics, and resin exports rose from 29,045 to 41,674 metric tons; while pharmaceutical exports rose only slightly, from 2,237 to 2,653 metric tons.

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Detergents/Mexico: Purex Corp. (South Gate, Calif.) has purchased a detergent plant at Hermosillo, Sonora, from Productos Quimicos through a stock exchange. The plant, built in '56, will supply Purex's Mexico City-based subsidiary.

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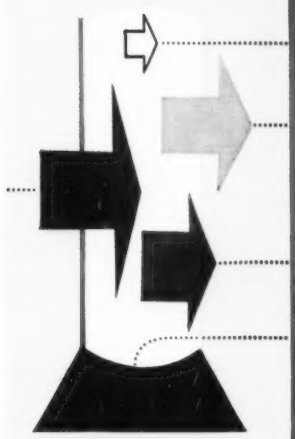

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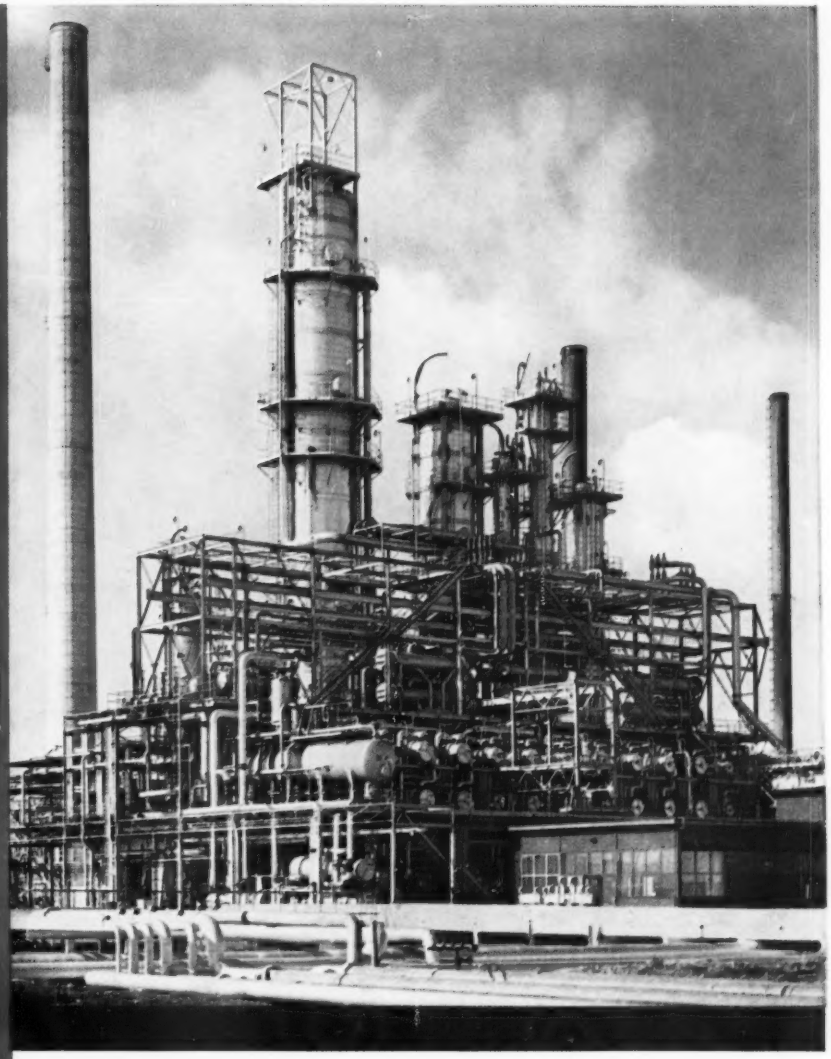

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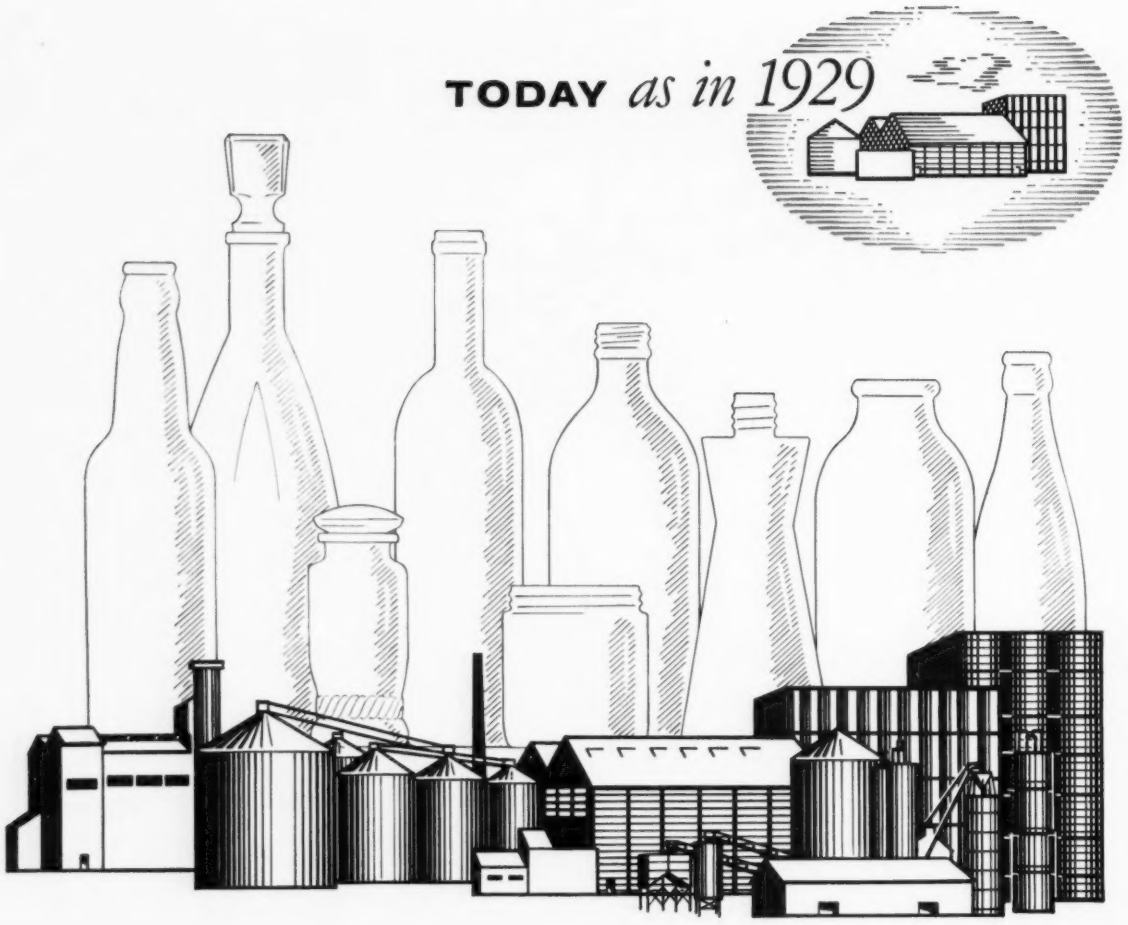

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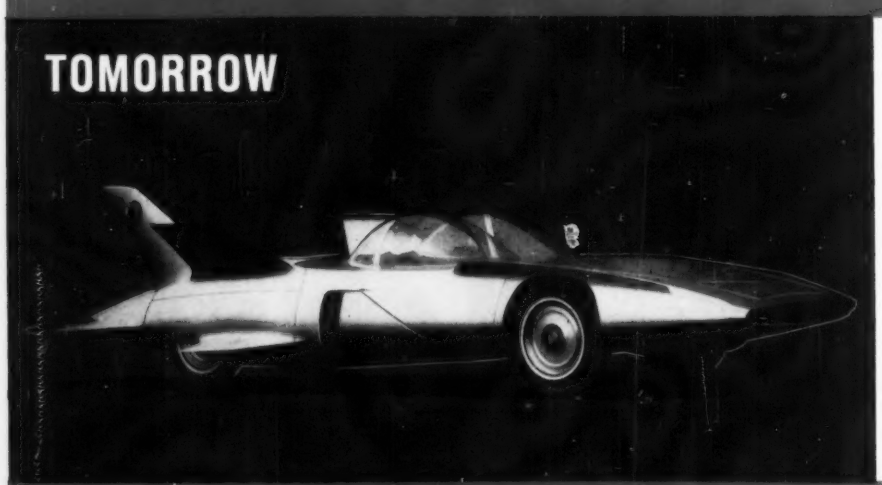

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Washington
Newsletter

CHEMICAL WEEK
December 5, 1959

Drug companies are readying for the Senate's price probe, which begins Monday. Here's the big picture:

The opening round—on prices of cortisone and derivatives—will stir up great interest with the old folks.

Sen. Estes Kefauver (D., Tenn.) is frankly starting out on cortisone because senators get so much mail complaining of the high price. He decided on this tactic after Sen. George Smathers (D., Fla.), with a big old-age constituency, threatened to have his committee probe these prices. Smathers pointed out that old-age pensioners with arthritis may spend $30 a month on cortisone pills while drug companies make bigger profits than companies in oil or steel.

The committee, in probing whether cortisone prices are "reasonable," will look into similarity of prices, patent and license arrangements. Sen. Joseph O'Mahoney (D., Wyo.) has lent the committee his expert on patents, Hershel Clesner, general counsel of the Senate Judiciary Committee's patents subcommittee.

The companies testifying first—Schering, Merck, Upjohn—will emphasize that the "miracle drug" field is a high-risk business; that research costs must be regained before the product becomes obsolete, and that drug prices have risen less than other products. But the argument may boil down to "how much profit is too much?"

Drug makers face a tough investigator in the committee's chief counsel, John M. Blair, well known for his investigations and prolific writings on concentration in industry. He was author of the oil cartel report at the Federal Trade Commission, which resulted in a court case, and was instrumental in writing the 1950 Kefauver-Celler amendment bringing physical mergers under the antitrust laws. Blair has also led the "administered price" probe of steel, autos and bread.

The hearings, whatever they mean for the drug industry's future, will lend fuel to the growing campaign to do something about high medical costs. House hearings on free medical care for social security recipients, for example, will benefit from the interest aroused by the hearings.

Even if the hearings don't result in legislation, the drug industry will be on "permanent notice" that drug prices, like steel prices, are a matter of public concern. Some observers feel, for instance, that Kefauver's hearings last year on steel pricing policies are a big influence preventing a steel price hike now. A bill is now pending in Congress that would require companies in the concentrated industries to give advance notice of any price hikes.

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More federal government business for CPI may result next year from a big analysis of procurement practices now under way. All agencies

Washington Newsletter

(Continued)

are supposed to report to the Budget Bureau by Dec. 31 on what activities they are engaged in that could be turned over to private business.

Budget Director Maurice Stans says he wants to discontinue all commercial-industrial activities except those for which there are "compelling reasons" to continue. Slightly higher costs is no "compelling reason." Higher costs would justify continuance "only if the costs are analyzed on a comparable basis and the differences are found to be substantial and disproportionately large."

This is tough talk. But how seriously it will be taken remains to be seen. Stans certainly intends to carry the order out. But he will meet strong resistance—from agencies, which will plead need for assured supplies at lowest possible costs; from labor unions representing federal employees, which have already attacked the move as "a legalized sell-out to profiteers"; from congressmen, who will have mixed feelings about supporting free enterprise when it means higher costs.

The Budget Bureau will take several months after Dec. 31 to compile the various agency reports and recommend discontinuance of federal activities. And two large agencies, the Defense Dept. and Atomic Energy Commission, have already told the Budget Bureau they can't possibly survey all their activities by Dec. 31. Defense expects to make section-by-section reports over the next several months.

Defense also claims it has already gone a long way toward getting out of competition with private enterprise. Officials list some 300 activities they have curtailed over the past five years, including such things as paint production.

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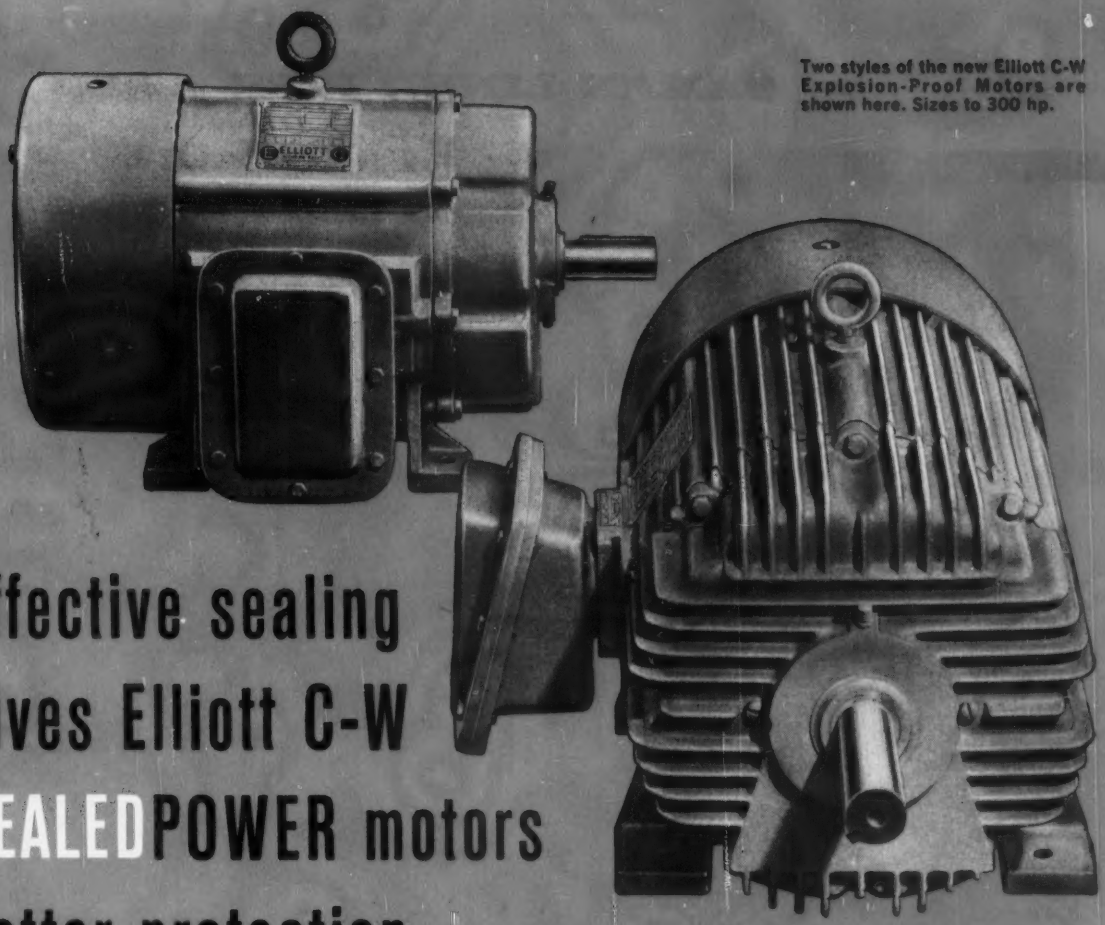
"Don't smoke cigarettes" follows "don't eat cranberries" as the latest advice to consumers from the Health, Education & Welfare Dept. The tobacco industry is at least as angry as the cranberry industry was.

U.S. Surgeon General Leroy Burney, with Secretary Arthur S. Flemming's whole-hearted endorsement, released a report saying that the "weight of the evidence" implicates smoking as the principal causative factor in lung cancer. The report represents no original research. It is H-E-W's long-promised compilation of various and conflicting studies, with Dr. Burney's personal conclusions.

The president of the Tobacco Institute, James P. Richards, cried "foul play", attacked Burney for supporting "time-worn much-criticized statistical charges against smoking" and coming up with "extreme and unwarranted conclusions." The institute's scientific director, C. C. Little, cited conflicting evidence that he feels negates H-E-W's conclusions: heavy smokers in South Africa, who don't breathe polluted air, have little lung cancer; lab animals exposed to tobacco smoke don't get cancer; many heavy smokers don't get cancer, while nonsmokers do.

Unlike cranberries, this H-E-W edict is causing no panic. But this situation couldn't be ended by burying a few crops.



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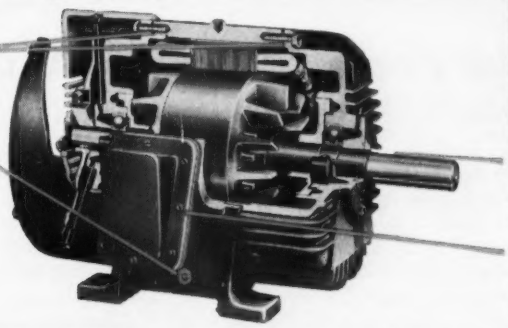

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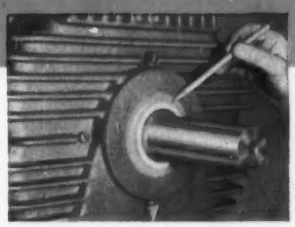

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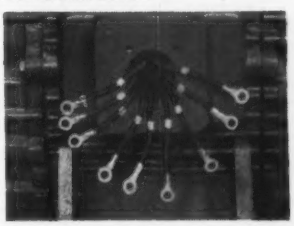

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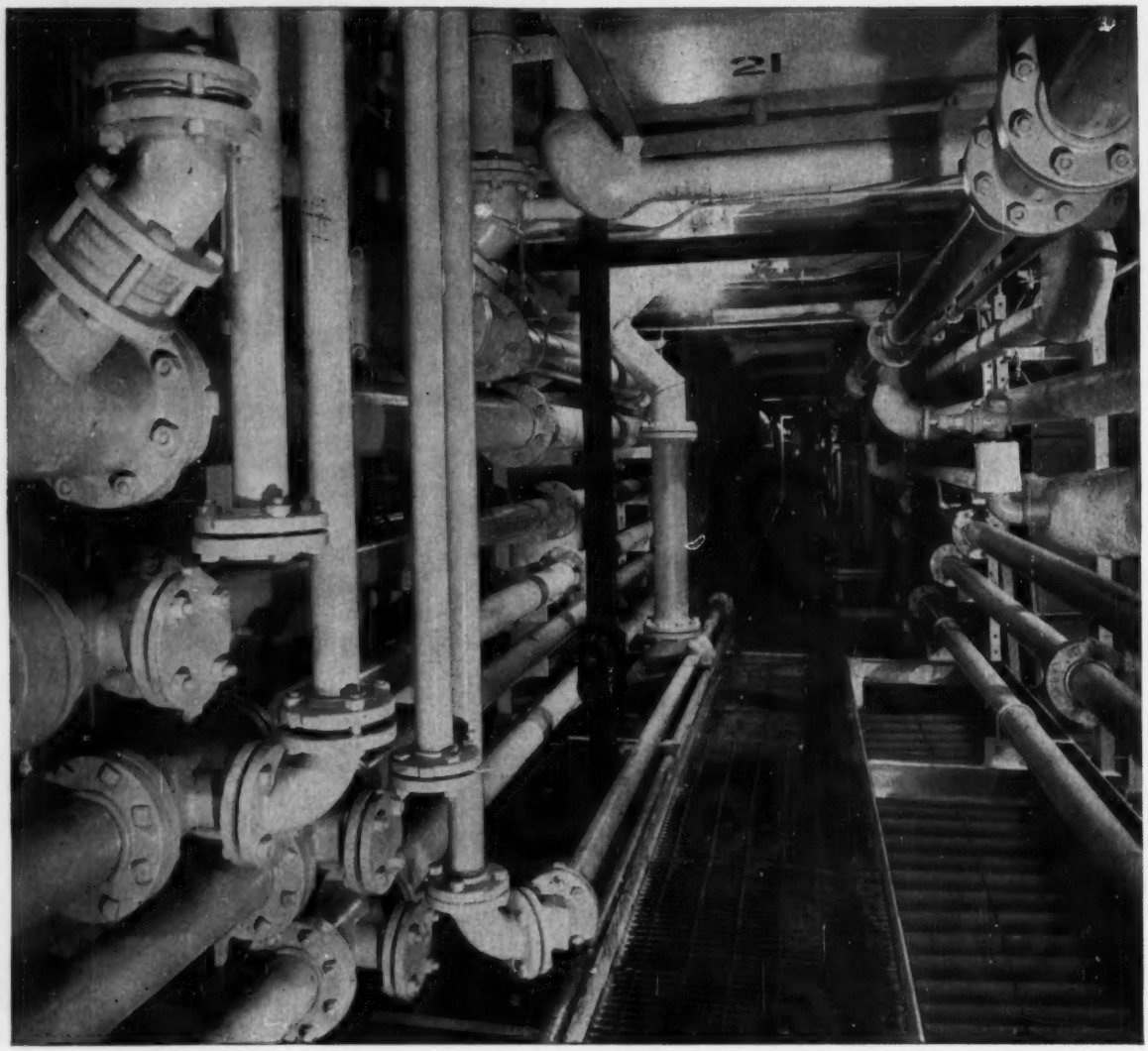

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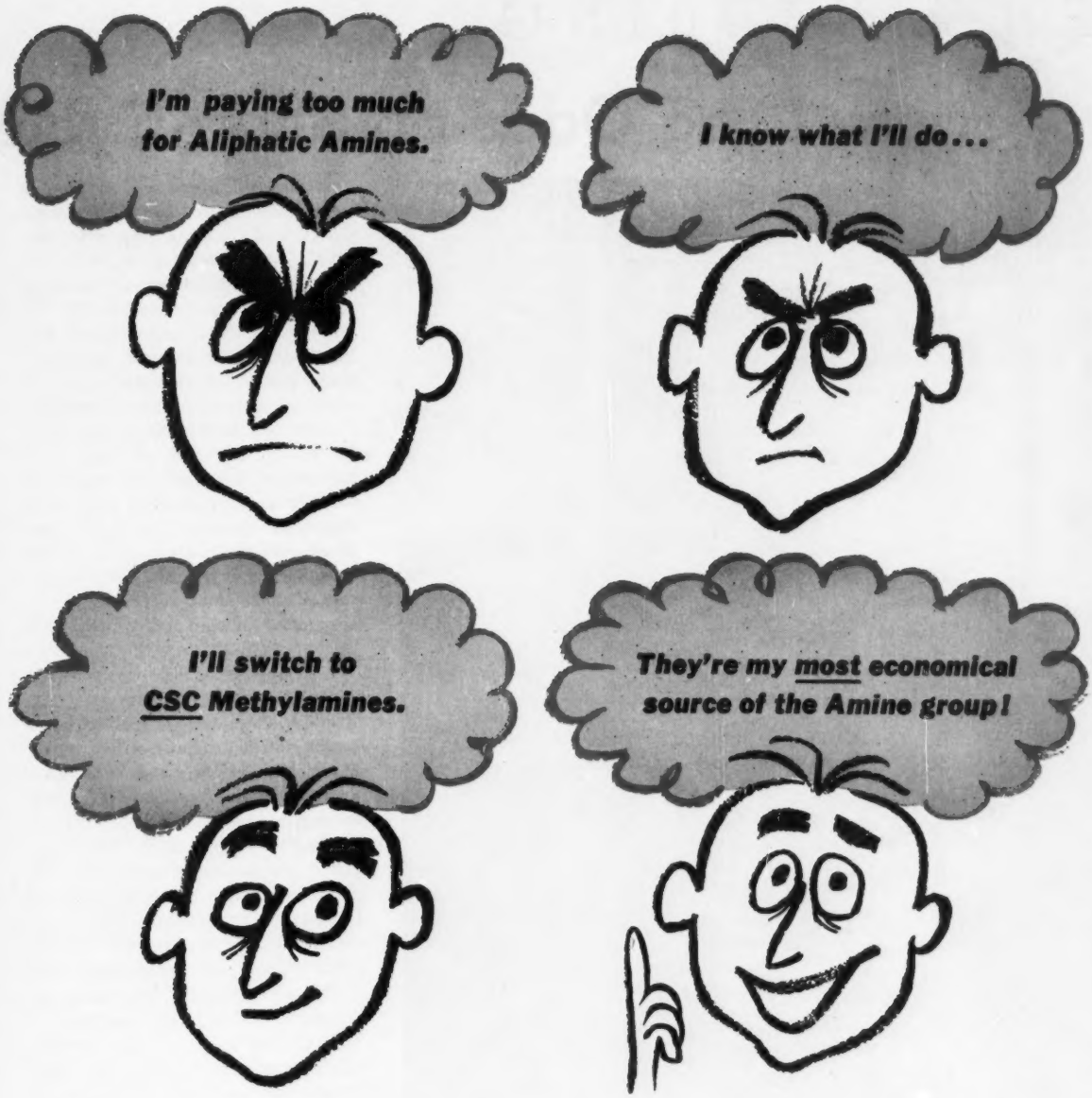
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Betting Long Odds on Short-Cycle

CW PHOTOS—ED WALLOWITCH

CONFIDENT PRESIDENT Hyman Bzura surveys startup operations.

Shakedown operations are getting under way this week at Bzura Chemical Co.'s $2.5-million citric acid plant at Fieldsboro, N.J., (*CW, Aug. 29, p. 41*), scheduled to be onstream around the first of March. It will employ a new deep-fermentation technique, developed by Bzura, Inc. (Keyport, N.J.), for the production of citric from crude blackstrap molasses.

Although the original design capacity of the new unit was pegged at 8.5 million lbs./year, President Hyman Bzura now predicts that actual output will be more than double that. Basis for this optimism: a recent modification of the deep-fermentation process, piloted at Keyport and incorporated in the new facility at a cost of $150,000.

If the expected improvement is realized in actual full-scale operation, Bzura will become the U.S.'s second-largest citric producer. Chas. Pfizer & Co. has long held the No. 1 spot, with estimated capacity in excess of 50 million lbs./year. Miles Chemical, currently the only other citric producer, last month started up a $3.6-million expansion that brings its total capacity to more than 15 million lbs./year. (About 6 million lbs. of Miles' output goes for captive uses.)

Competitive Edge: Two reasons for Bzura's entry into citric acid production: (1) the basic process improvement, which enables the new plant to compete with older, established facilities; (2) citric is a product requiring special know-how and a capital investment sufficiently large to discourage potential small-company competition. The large-size equipment needed for economic fermentation operations makes it a costly investment. Even large companies have balked at challenging Pfizer's lead in experience and productive capacity.

Bzura claims his process modification is the ace he holds. Radical, and still undisclosed, the process reportedly yields high conversion of very low-cost sugars in a very short fermentation cycle. Key to these improvements: a chemical treatment of the mould (a mutation of the *Aspergillus niger* strain) used in the fermentation, coupled with precise tempera-

Citric Acid Route

ture and back-pressure control during the mould-growing stage and subsequent sugar conversion stage.

The short cycle time, says Bzura, is the most important single factor influencing the economics of the operation. Even assuming labor requirements and raw-material costs equal to those of other methods (Bzura predicts both will be lower than his competitors'), the plant's ability to turn out more batches of citric in a given period reduces the installed cost of the plant per unit of productive capacity, thus minimizes depreciation charges per pound of product. Bzura won't disclose the exact length of his abbreviated fermentation cycle, says only that it is "much shorter than other citric processes."

Low-Cost Sugar: Another important economic advantage claimed for the Fieldsboro plant is its ability to use very low-grade—and, therefore, low-cost—sources of sugar. Unlike Miles' deep-fermentation process, which requires deionized, high-test molasses, Bzura's process reportedly can use Puerto Rican crude blackstrap molasses—or even refiners' molasses (residues from commercial sugar refining). "With the improved chemical pretreatment of the mould," says Bzura, "we've found that the cruder the raw material is, the better the yield."

In full operation, the plant will use Puerto Rican molasses piped directly from a 3-million-gal. storage tank through a continuous sterilizer and into the fermenters. The continuous sterilizer was designed by Bzura engineers, is said to be the first such unit tailored for fermentation processing.

Another unusual feature of the plant is the battery of 30,000-gal., stainless steel fermenters, which were "designed in reverse." Instead of settling on a component size and designing from the ground up, says Bzura, the company first selected the largest agitator commercially available, then designed the largest tanks it could agitate satisfactorily.

The first pair of fermenters, currently undergoing startup operations, have added features—variable-speed drives, impeller blades that can be

First pair of 30,000-gal. fermentation vessels (background) feature built-in flexibility, will serve as full-size pilot units in development of new processes.

PILOT-PLANT OPERATOR shows product of short-cycle citric process.

BZURA CHECKS completion schedule with construction boss John Muir.

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varied both in pitch and in length—to permit new processes or operating modifications to be tested on full-size commercial batches. In this way, says Bzura, many of the headaches involved in scaling-up operations, from 3,000-gal. pilot-plant batches to 30,000-gal. production batches, can be avoided.

Conventional equipment will be used for final recovery and purification of citric acid. The steps following fermentation: filtration; precipitation of citric as the calcium salt; reprecipitation with sulfuric acid to drop out calcium; decolorization, chemical purification, crystallization, centrifugation, drying and bagging of the citric acid.

Cost Cutters: Although Bzura is still a few months from proving his process in actual production, he is confident that the Fieldsboro plant will be economically competitive with the established citric producers. The low cost of blackstrap molasses—about 2¢/lb. of sugar content—is expected to provide an edge over the starting materials used by Pfizer (beet molasses, priced about 50% higher than cane molasses) and by Miles (high-test molasses, costing about 3¢/lb. plus 1¢/lb. for deionization).

Bzura's labor costs are also expected to be lower than average. All of the fermenters will be operated by two men. And, compared with the shallow-tray fermentation, says Bzura, the short-cycle, deep-fermentation technique's handling and maintenance requirements will be very low.

What's Ahead: Despite reported overtures from several U.S. firms, Bzura has decided against any joint ventures or licensing arrangements in this country. However, the company is entertaining at least four "attractive" foreign offers, had the engineering firm of Singmaster & Breyer make feasibility studies of proposed foreign plants. Since negotiations with foreign firms are still in preliminary stages, says Bzura, it's too early to predict the size and location of potential joint ventures overseas.

As for the future of the Fieldsboro plant, the company has expressed its interest in "any chemicals used by the pharmaceutical industry and which can be produced by fermentation." Companion products of citric acid are being contemplated, but probably won't reach the serious planning stage for at least a year or two.

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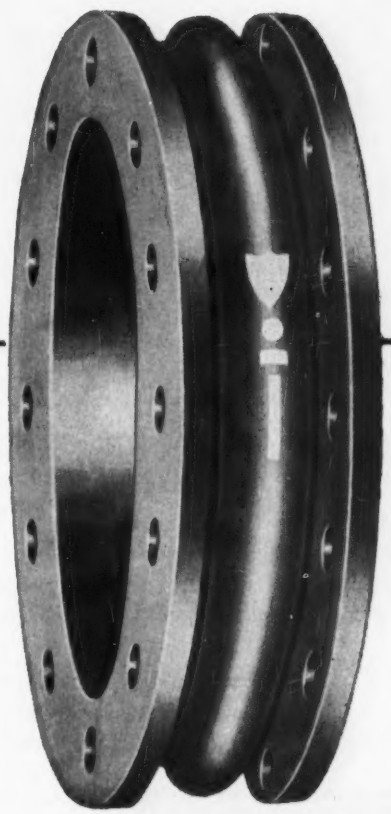

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PROCESSES

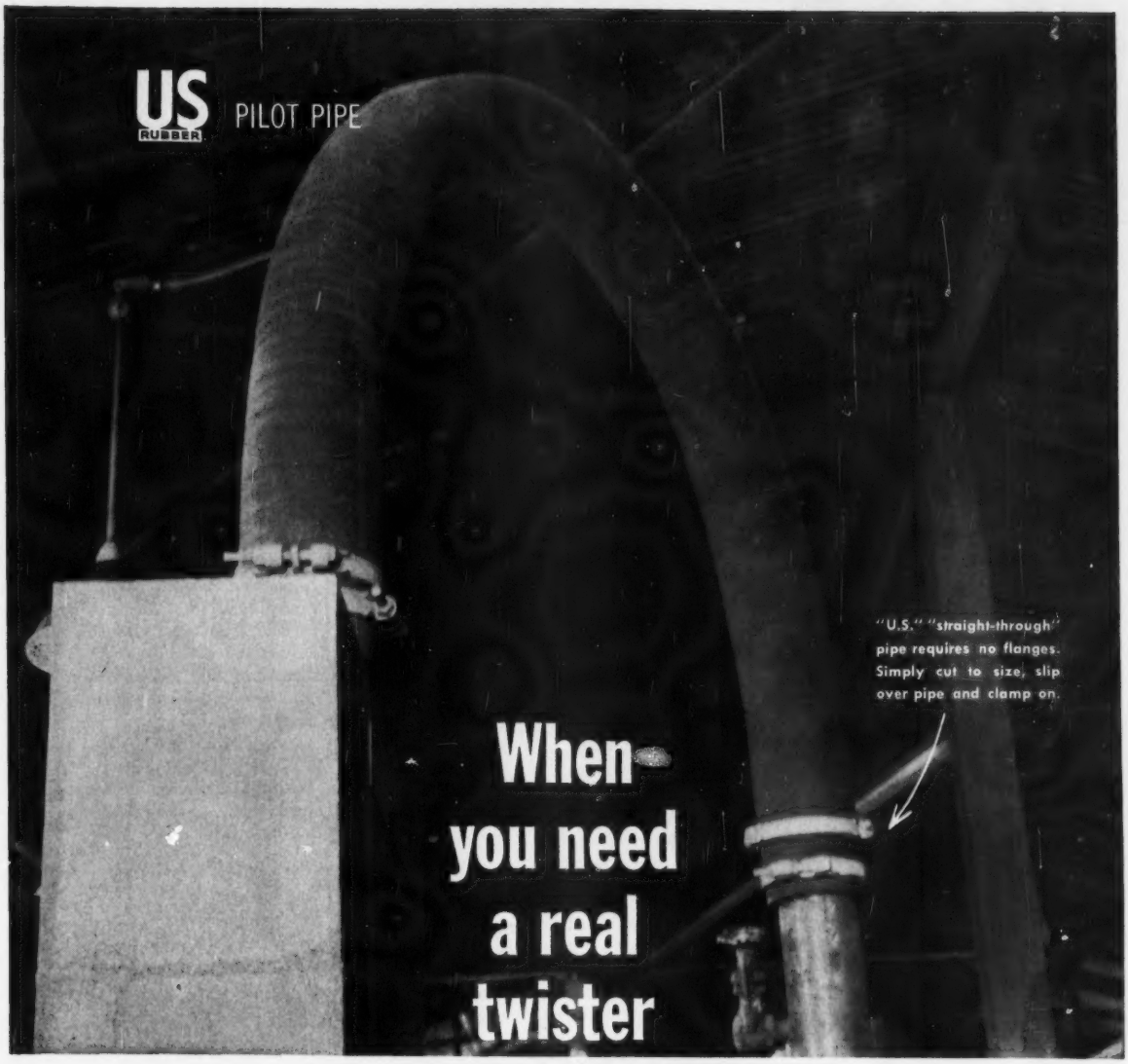
Citric Isolation: Another new twist in citric acid processing (*see pp. 36-7*) was recently patented in Germany (DBP 1,055,483) by Joh. A. Benckiser GmbH. (Ludwigshafen). It involves the use of potassium hydroxide to precipitate up to 80% of the product as high-purity monopotassium citrate. Subsequent electrodialysis yields the acid and potassium hydroxide for recycle to the process. Calcium chloride or hydroxide precipitates the remaining 20% of the product as potassium calcium citrate, which is then converted into the monopotassium salt by sulfuric acid. The method is said to reduce raw-material costs and to eliminate the large quantities of calcium sulfate waste that result from the conventional method of precipitating citric as the tricalcium salt.

•

Sorbic Acid: Farbwerke Hoechst AG (Frankfurt, Germany) has developed a new process for producing sorbic acid from ketene and crotonaldehyde by using a catalyst of zinc or cadmium. The catalyst promotes the reaction at ordinary temperatures in inert organic solvents; its use avoids corrosion problems. [This problem is believed to be one reason why Union Carbide Chemicals switched from the ketene-crotonaldehyde route to the oxidation-of-hexadienal process (*CW, Aug. 13, '55*) to make its sorbic.] Hoechst's free sorbic acid is isolated by direct distillation under vacuum at temperatures near 200 C.

•

Package Disposal Process: The American Shipbuilding Co. has developed a waste disposal treatment—called Biogest—claimed to be the first package process providing complete biological treatment. The process, based on research done at Massachusetts Institute of Technology, is completely automatic, uses aerobic (oxygen-consuming) bacteria. The unit first grinds raw sewage, reducing solids to less than ¼-in. diameter, feeds it into the aerobic mixed liquor for bacterial attack. Exposed to fine bubble aeration, the liquor is reduced to stabilized odorless effluent within a few hours; solids take a longer time. The effluent needs no supplementary treatment, Asco says, meets standards of the U.S. Public Health Service. Since the system requires a stream of air, it can be stopped or started at will. It was designed for use in mines and aboard ships, measures 10x3½x6 ft.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news briefs...

ON THE CREATIVE USE OF M&C PROCESS MATERIALS

*Plastics molder boosts sports car body strength with ASP® filler

Molded Fiber Glass Body Co., maker of the body for the prominent sports car pictured, found ASP-filled moldings consistently met and exceeded customer specifications...standardized on M & C's aluminum silicate pigments for filling parts requiring high physicals.†

Plastics molders like the quality-boost *and economy* of high-loading ASP fillers. In addition to building physicals, these kaolin-derived M & C process materials make smoother and denser surfaces, eliminate crazing, lower peak temperatures from the exotherm and thus reduce shrinkage.

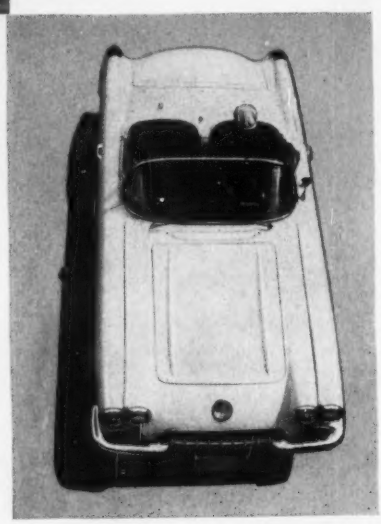
What will the ASP's do for your moldings? This is a *starred* item . . . check the coupon as the first step to finding out.

†Comparison of Body Specifications with Random Test Sample of Molded Laminate Loaded 29% with ASP 403.

	Specification	Sample
Reverse Impact, in.‡	8	10
Tensile, psi	15,000	19,200
Izod Impact	not specified	25.8
Flexural Strength, psi (room temperature)	25,000	40,100
Wet Flexural Strength, % retention	70	88.2
Flexural Modulus (10 sec.)		
Room temperature	1.30	1.77
Wet, % retention	70	79.2
180 F.	0.50	0.75

Sample is normal formulation of 9 to 1 ratio of resilient resin to styrene, 0.8% BPO catalyst, and ASP 403 filler loading of 29 weight % of the resin-filler total. Molded at 235 F. with 3-minute press time cycle.

‡Reverse Impact test simulates the effect of stones striking the underside of fenders or panels, and measures the ability of the smooth outer surface to resist this road abuse. A 12-in. square by 0.10-in. thick plastic laminated panel is placed on a 5-in. diameter ring, with a 30-mil veil mat between. A ½-lb., 1½-in. diameter steel ball is dropped on the center of the panel from varying heights, red dye is wiped on the lower side of the panel and then wiped off. Any minute surface fractures are penetrated by the dye and made visible as a mark or star. The specification and sample test values indicate the maximum drop distance for the ball without causing visible surface failure.



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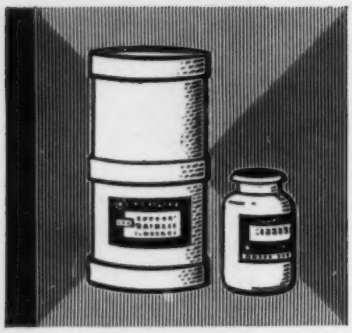

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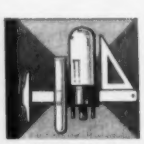
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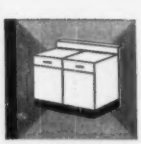
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CIL's Stewart (right) guides invasion of U.S. paint market.

Setting Up Shop in the U.S.

The entry of a U.S. firm into the Canadian marketing scene is a common event. On the other hand, when a Canadian outfit goes after U.S. customers, it's almost a man-bites-dog occurrence. Currently, there's a lot of speculation about whether the recent—but limited—invasion of the U.S. paint market by Canadian Industries Ltd. presages an all-out attack by the Canadian company on U.S. markets.

Canadian Industries Ltd., largest chemical manufacturer in Canada, has in the past few weeks set up a U.S. subsidiary under the name C-I-L Paints, Inc., which already is producing and selling paint in the U.S.

Right now the company is restricting its sales effort to one product, Dynakote (*CW, May 3, '58, p. 41*)—an oil-free baking finish based on a cross-linked vinyl copolymer—which it is producing at the Arnold, Hoffman & Co., Inc., chemical plant in Cincinnati. (Hoffman is an affiliate of Britain's Imperial Chemical Industries, as is CIL.) Initial capacity is said to be 250,000 gal./year. CIL is supplying equipment and technical supervision; Hoffman, plant space and personnel.

CIL invaded the U.S. market because this was the only way, according to company spokesmen, it could find to promote the sale of Dynakote in the U.S.

The company first approached several major U.S. paint producers with a view to licensing the product—a porcelainlike appliance enamel—but found them uninterested; most were working on similar developments of their own. So CIL decided it had no choice other than to start operations here itself. However, the firm told CHEMICAL WEEK that the door is still open to licensing and that it still hopes its offer may be taken up by some U.S. firms, now that the company has made a competitive step. CIL is asking a substantial five-figure advance on royalties as a licensing condition.

Somewhat allaying fears that the Dynakote move is just the opening wedge for further invasion of the market, CIL says it has no plans to follow up Dynakote with other U.S. ventures—at the moment. Any auxiliaries necessary for use with the finish—thinners, primers, etc.—may be made, but that's all. The firm feels confident, however, that it could successfully market other products in the U.S. "After all," spokesmen say, "we compete successfully with U.S.-owned companies here in Canada; why not in the larger U.S. market?"

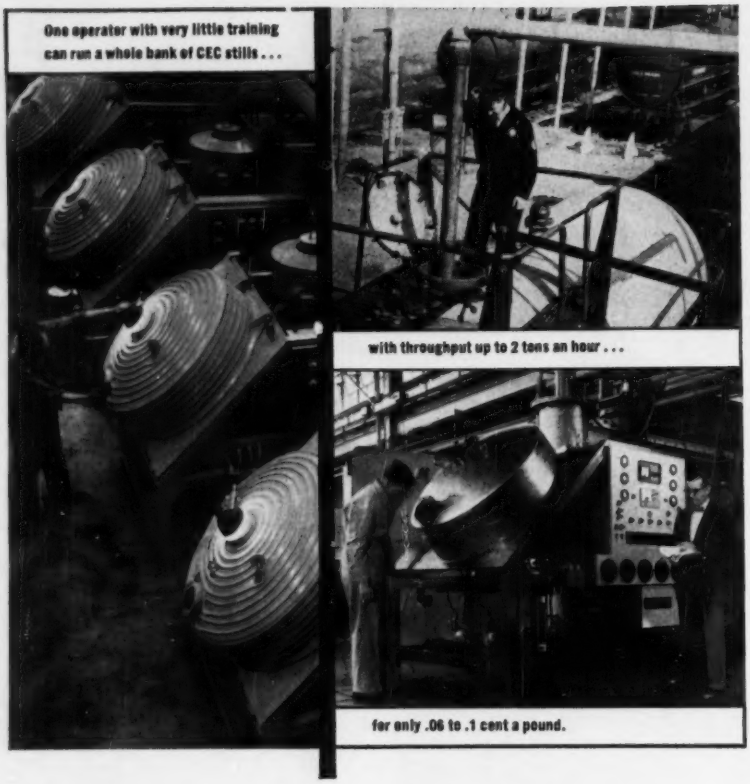
CIL's Paint Profile: Here are some particulars that may enable U.S. paintmakers to gauge the strength of this new—if still limited—aggressive Canadian competitor for home markets.

Largest paint manufacturer in the $140-million/year Canadian paint market is U.S.-affiliated Sherwin-Williams, with CIL (estimated sales $14 million) a close second. Not far from CIL is Canadian Pittsburgh Industries. The next two—also close together—are Glidden and British-owned International Paints.

CIL's position in the Canadian paint picture goes back to around 1918. At that time, the company was a joint subsidiary of Du Pont and Imperial Chemical Industries (ICI) and was known as Canadian Explosives, Ltd. When Du Pont (U.S.) acquired Flint Varnish & Color Works (Flint, Mich.) and its subsidiaries in 1918, one of these subsidiaries, Flint Varnish Color Works of Canada, was assigned to CIL (at that time CXL). In '53, Du Pont had to dispose of its interest, but ICI retained its holdings.

The introduction by the firm, in '20, of the Du Pont-developed Duco line of lacquers and later of Dulux enamel made the company a big factor in the auto field and it remains so.

Today it supplies all primary paint to every Canadian auto manufacturer, all finish paint to General Motors of Canada and to Studebaker, and some finish paint to Chrysler and Ford. In supplying the latter two,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SPECIALTIES

CIL competes with four or five other paintmakers. It also claims to be the dominant factor in the Canadian auto refinishing business.

Broad Line: In industrial paints, although CIL carries a complete line, it has specialized in furniture and appliance finishes. It is probably top seller of these in Canada, is also quite active in container coatings. In agricultural machinery finishes, military finishes, and structural steel coating, however, the company holds a relatively minor position.

In trade sales (consumer shelf goods), the firm carries a complete line of architectural indoor and outdoor household paints under the CIL trademark.

CIL Selling: General manager of CIL's paint division is R. C. Williamson. He heads the three paint plants (two in Toronto, one in Montreal) in which some 1,000 workers are employed.

Sales manager is A. R. Stewart. Under his supervision are four selling divisions: Automotive, Refinish, Trade, and Industrial. Auto and industrial sales are handled directly by CIL salesmen. Refinish products are sold through distributors. Trade sales are made through independent retail stores. About 125 sales personnel are employed by the paint division.

CIL is probably one of the most self-sufficient of Canadian paint firms. While it makes almost none of its basic raw materials, it does produce a majority of its own intermediates: alkyd resins, vinyl copolymer resins, melamines and urea-formaldehydes, and oil-type varnishes from gums and resins. It also processes nitrocellulose for its lacquers.

Applications Research: Like its U.S. counterparts, the paint division does little basic research, leaving that to the basic chemical producers. The division has a development laboratory at Toronto, employs more than 100—forming a research team larger than those of all but four or five U.S. firms. In addition to the Toronto lab, the paints division is backstopped by CIL's industrial research lab at Beloeil, Que.—probably the largest in the Canadian chemical industry. It was this lab that initiated work on Dynakote about 10 years ago, with fundamental investigations into vinyl copolymer properties.

Outlook: CIL hopes to repeat in

Progress Report...

—UCAR butylene oxide 12
—Alkylene amines
—Hexylene glycol

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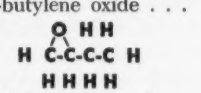

1,2-butylene oxide

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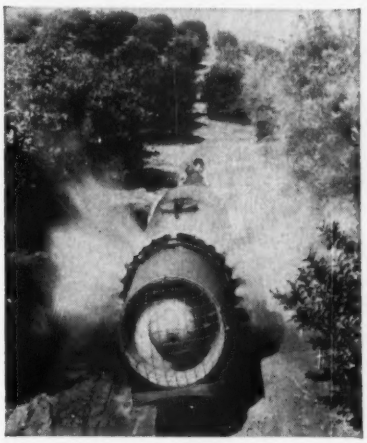
A new technical bulletin is now available. It contains information on the physical properties, suggested applications, and physiological properties of UCAR butylene oxide 12. For your copy check the box "UCAR butylene oxide 12" on the coupon.

To improve agricultural chemicals . . .

Manufacturers of agricultural chemicals find it profitable to consider CARBIDE's alkylene amines when devising new formulas or improving current products. For instance . . .

Iron is necessary for the formation of chlorophyll. So, it affects the growth of all citrus fruits, flowering shrubs, lawn grasses, and shade trees. If these plants don't get enough iron they quickly become pale green or yellow. This condition, known as iron starvation or iron chlorosis, may slow the growth of plants and even kill them.

Iron chelates, made from the tetraacetic acid derivative of CARBIDE's ethylene diamine, offer a simple but effective means of correcting iron starvation in plants. The chelates contain iron in water-soluble form. Thus, it is readily available to plants in a form they can use.



Iron chelates, made with CARBIDE's amines, can be sprayed directly on the foliage or applied to the soil feeding the roots.

Further information on the many uses of CARBIDE's ethylene diamine and other alkylene amines is contained in a new booklet. For your copy, check the coupon.

Blending liquid systems or improving latex paints?

Most systems comprised of oils and liquids that are ordinarily difficult to blend can be effectively coupled by the addition of hexylene glycol (2-methyl pentanediol-2,4). Industrial cutting oils, soluble oils, liquid detergents, drycleaning soaps, and emulsions are representative of mixtures that become miscible with the aid of hexylene glycol.

The inclusion of hexylene glycol in alkyd-modified styrene-butadiene latex paint formulas permits a higher pigment volume concentration and improved leveling with brush or roller. The paint film gains extra scrub resistance, better hiding properties, and less yellowing at a lower cost per pound of solids.

Lacquer-type inks, and both specialty and standard inks based on resins insoluble in ethylene glycol or diethylene glycol, can be formulated with hexylene glycol. Its evaporation rate is also of benefit in fast-drying and steam-set inks.

Hexylene glycol helps to reduce particle size and to prevent agglomeration during grinding operations involving silicious materials or Portland cement. A more uniform aggregate is obtained, while valuable time is saved.

Other important uses of hexylene glycol are in the synthesis of sulfolanes, esters and diesters. A 62-page booklet, "Glycols," contains properties and other facts about hexylene glycol, together with profitable information about CARBIDE's other glycols. Check the coupon for a copy.

Tear out this coupon. Check the boxes on which you'd like more information, and mail to Dept. HW, Union Carbide Chemicals Company, 30 East 42nd Street, New York 17, N. Y.

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the U.S. the success it has enjoyed with Dynakote in Canada. Five of the eight major appliance manufacturers there, representing half the total market, are using the finish—and it's been in full production for only about 18 months.

CIL feels that it has a long start over other companies in vinyl copolymer film-forming resins. It admits similar resins can be made outside the CIL patents but claims that considerable production know-how is required to avoid making a product that will "crater." Further the company claims, its patents cover the most economical method of manufacture.

CIL's estimated yearly output of 250,000 gal. constitutes only a small share of the U.S.'s total paint output. However, it's obvious that Canada's second-biggest paint maker can hardly be expected to be happy with such a thin slice of the $2-billion U.S. paint pie. If CIL can make its limited venture pay off quickly, there's every reason to expect it to make a bolder move. Moreover, one Canadian concern's success may appear worth imitating by other north-of-the-border companies. No wonder U.S. paintmakers are watching the enterprise closely.

Subs for Sun

One of the fastest-moving cosmetic items to hit drugstore counters in years is a product now being given a high-powered promotional effort by Product Research Corp., maker of Regimen.

The company is currently going all out on a product called Man-Tan, an aftershave "sun tan" lotion. Product Research claims the product gives the user "a golden tan" in six hours, although it's not a dye or makeup and won't stain clothes. The product—which contains a "secret ingredient," called Protosol—is a clear fluid that sells for $3 in the 4-oz. size, and $5 for the 8-oz. bottle.

Although the Man-Tan label doesn't list ingredients, the product is reported to contain dihydroxyacetone, alcohol and water—and is touted as containing vitamin D.

The product's being tested in 14 marketing areas and will go national in the next few weeks. It has been sold by mail order on a limited basis for about a year, got a big kickoff in the New York area last week.

A similar product, called Positan, a sun screen and tanning agent combination, is being test-marketed in Florida, will probably follow Man-Tan into national markets. The latter product is being sold with a brush applicator on the bottle top.

PRODUCTS

Nonionic Surfactant: Union Carbide Chemicals Co. (New York) has developed Tergitol Nonionic E-35, an alkyl phenylpolyethylene glycol ether surfactant for use with dry alkaline materials. E-35 is suggested for industrial uses such as bottle washing and metal cleaning, and is reported to be stable, nondiscoloring and low-foaming.

•

Bonding Product: Borden Chemical Co. (New York) is marketing a nonflammable, waterproof adhesive for bonding rubber and vinyl tile to on-grade concrete, and linoleum to steel, terrazzo and other nonporous surfaces. The product, called Cure-Set, is said to have a working life of 30 minutes and full setting time of 24 hours. It is available for both industrial ($7.77/gal.) and retail ($9.55/gal.) use in liquid paste and powder forms.

•

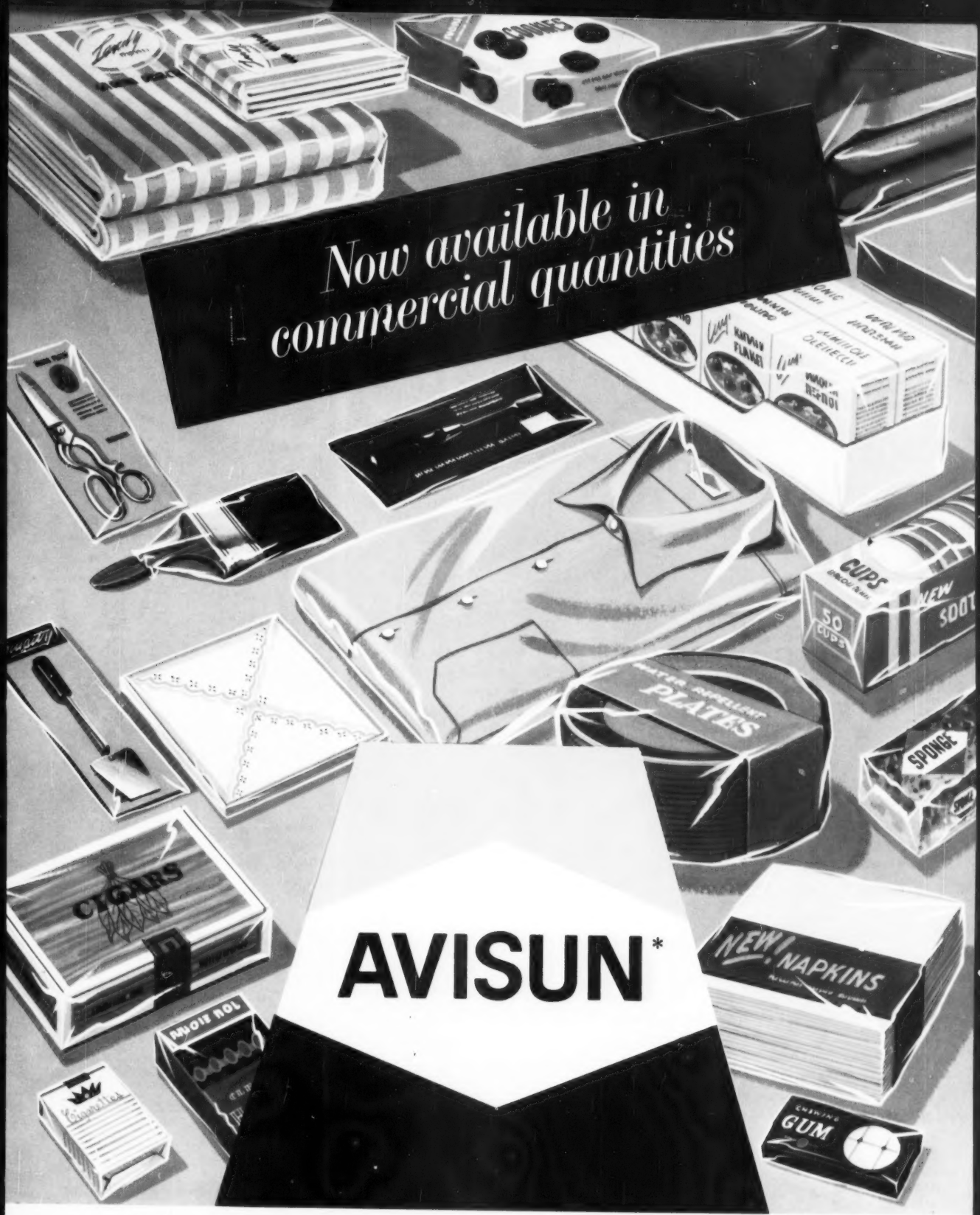
Siftproof Box: Continental Can Co. (New York) has developed a corrugated box with pouring spout designed for domestic packaging of granular and powdered materials. The spout is said to permit controlled dispensing of contents and to be the first spout that locks into position when opened. Sample cost of a 25-lb. box (in shipments of 10,000-15,000): 15¢ each, including printing.

•

Epoxy Adhesive: Rubber & Asbestos Corp. (225 Belleville Ave., Bloomfield, N.J.) has developed a low-cost, modified epoxy adhesive, Bondmaster M685. It's designed for sandwich-panel construction.

•

Copper Process: Hanson-Van Winkle-Munning Co. (Matawan, N.J.) has developed a bright-copper cyanide process, which it calls Copper-Lume. The process is reported to have good metal distribution, and to give a smooth coating over a wide temperature and current-density range.



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Polypropylene Film

Painting Away Power-Switching Problems

In Pittsburgh this week, Westinghouse Electric Corp. is readying for market a novel "paint-on" electrical insulation that may be applied by plant maintenance men over conventional insulation.

The coating is claimed to upgrade the original insulation, make it more resistant to breakdown by arcing caused by surface short-circuiting known as "tracking."

The new insulation, an epoxy-resin type, has been under development the last nine months by engineers Jacob Chottiner and Byron McBride of the company's materials laboratories, and B. A. Moreland of the component products department. It's claimed to have good bonding characteristics and ready adherence to other types of insulating materials. Its high resistance to chemical attack and to the combination of moisture absorption and dust that causes tracking could make the insulation a "natural" for chemical plant atmospheres.

Westinghouse's tests show it to be up to 300 times more resistant to breakdown by tracking than phenolic insulating materials. As a result of these tests, the company has made it part of a new insulation system, called Limitrak, which is now the standard on new 5,000-15,000-volt power-switching equipment.

For equipment already in service, the epoxy can be spray- or brush-painted over existing insulation. It may require two coats to obtain the recommended 20-mil thickness; but the coats air-dry, require no baking and special curing. Westinghouse hasn't yet decided on a selling price for the paint. But epoxies are comparatively expensive resins.

An advantage that could offset high price: the epoxy is expected to last indefinitely, even in atmospheres severely contaminated with moisture and dust.

Hot Spots: C. E. Arntzen, manager of Westinghouse's materials laboratory, explains what happens to ordinary insulation when moisture and dust are deposited on the surface. "These contaminants are the origin of tiny individual electric arcs, which cause hot spots on the surface of the insulation. Under this heat and electrical pressure (stress), ordinary insulating materials tend to 'unlink.' That is, their large complex molecules break down into simpler ones, finally depositing carbon, which can conduct electricity and form a continuous path for an electrical discharge. The electricity then tracks across the surface, chars the insulation and shorts out the apparatus," he says.

Switchgear manufacturers, are well aware of the tracking problem, have been replacing widely used phenolics with track-resistant insulation wherever possible. Porcelain is nontracking and nonburning, is used for some switchgear parts where high impact strength is not required. Cast epoxies are widely used in Europe, haven't enjoyed much favor in this country. One probable reason: manufacturers' retooling costs might not offset any

High-Power War on Electrical Failure

The chemical plant engineers pictured here are checking out the relay system of a newly installed electrical substation. It's a familiar scene around chemical plants, where electrical systems are undergoing a quiet revolution. Plant power requirements are doubling every 10 years. Newer plants are augmenting their power systems; older plants are changing to new higher-voltage systems as existing equipment is found to be inadequate.

As plant power distribution systems become more complex, attention focuses on devices to break relay circuits, isolate faults without shutting down entire systems. Within the last year, makers of switchgear (i.e., circuit breakers and related equipment) have upgraded their equipment. They've paid particular attention to improving insulation that prevents failures due to arcing caused by moisture and dust – commonly encountered in chemical plants. Latest advance: a new epoxy resin developed by Westinghouse for use on insulation of new switchgear and for switchgear already in service.

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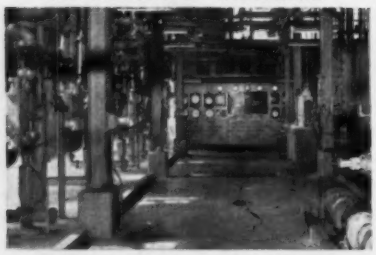

IWT has long been known for successfully applying ionXchange to processes other than water treatment, including such familiar ones as recovery of chromic acid, purification of glycerine to a very high degree, removal of iron from hydrochloric acid, and purification of such organic chemicals as formaldehyde, methanol, and ethylene glycol.

TYPICAL IONXCHANGERS FROM CURRENT ORDERS INCLUDE THE FOLLOWING

MILK A condensed milk plant in Iowa will use ionXchange to reduce calcium content and produce a "soft-curd" milk.

WINE An upstate New York wine producer has ordered ionXchange equipment of polished stainless steel for stabilization ("cold-proofing") of wine.

GLYCERINE The first full-scale commercial ION EXCLUSION system for de-salting glycerine will be installed in a western chemical plant. A mid-western glycerine producer will install ionXchange equipment to recover USP glycerine from a waste stream, without distillation.

GRAPE JUICE An eastern food processor has ordered equipment to remove excess potassium from grape juice.

CHROMIC ACID A midwestern auto parts plant will reclaim chrome plating solution at a rate sufficient to pay for the ionXchange equipment in less than a year.

CITRIC ACID An eastern producer will remove heavy metals and alkaline earth metals from citric acid by cation exchange.

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potential performance advantages.

Although most glass-reinforced polyesters are not both track- and flame-resistant, switchgear manufacturers recently have come up with special types of polyesters that possess the two characteristics, have been replacing the phenolics with them. For example, Westinghouse has been researching its Limitrak system for the last one and one-half years. Its new system uses porcelain, glass-reinforced polyesters and epoxy resin.

Key use of the epoxy: for bushings. Harry Sheppard of Westinghouse points out that the high-voltage characteristics of bushings are critical, require the use of resin-impregnated paper rather than glass-reinforced polyesters.

Safety Factor: "The phenolics on switchgear now in service have excellent track resistance, indefinite life, but only under the best conditions. And we seldom find these conditions in industry," says Sheppard. Often, the switchgear is installed in moist, chemical atmospheres, or may be in plants that make dusty products (e.g., cement).

Sometimes the electrical equipment must be relocated. Under the most adverse conditions, special housings must be built for the equipment; at times, protective atmospheres must be used.

Under the best conditions, insulation must be cleaned occasionally. Under poor conditions, it may have to be cleaned every few days. Says Sheppard, "We aren't saying that cleaning can be discontinued when the insulation is coated with the new epoxy. Rather, it doesn't require as much care. We want maintenance people to look at the epoxy as a safety factor."

The new coating should eliminate worn insulation requiring periodic resurfacing, or major insulation failures requiring the return of equipment to the factory.

Stepped-Up Ratings: Although Westinghouse is now using the epoxy only on 5,000-15,000-volt power switching equipment, the company is researching its use on other types of breakers and on motor insulation. Once the resin is put on the market for maintenance service, Sheppard says, other uses will probably be found, and plants may come up with some other good ideas.

But he sounds one note of warning. The resin is not an outdoor material. It can't be exposed to ultraviolet light. It can be used on outdoor equipment, of course, provided the equipment is enclosed.

While much experimentation with the new resin remains to be done, its ability to increase the maintenance safety factor in power-switching equipment should make it a welcome addition to now available electrical insulating materials.

EQUIPMENT

Mixer: A new heavy-duty mixer for extra-viscous solutions is offered by J. H. Day Co. (4932 Beech St., Cincinnati, 12). It's called the Daysolver, has heavy-duty steel impeller shaft, column, frame and bridge that prevents vibration under extreme loads. Two-speed and variable-speed drives are available on all models. Size range: laboratory to 75-hp. units.

•

Fan: The Clarage Fan Co. (Kalamazoo, Mich.) has a new line of ready-to-run belt-driven fans with motor and drive in one assembly. Motor, drive and bearings are completely accessible; direction of fan discharge is said to be easily changed in the field. Largest units handle 25,000 cfm. at static pressures to 2½ in. and temperatures to 300 F.

•

Scale: A new electric hoist scale for use on lift trucks or other materials-handling vehicles is now available from Gilmore Industries, Inc. (13015 Woodland Ave., Cleveland). The unit, designated M116, has (1) two strain-gauge load cells, (2) an amplifying box that steps up the electrical impulse coming from the load cells, and (3) a digital-type indicator. Instrument components are sealed against dust, mositure, and temperature variations. The scale is powered by the vehicle's 6-volt dc. battery, is offered in capacities of 1,000 to 100,000 lbs.

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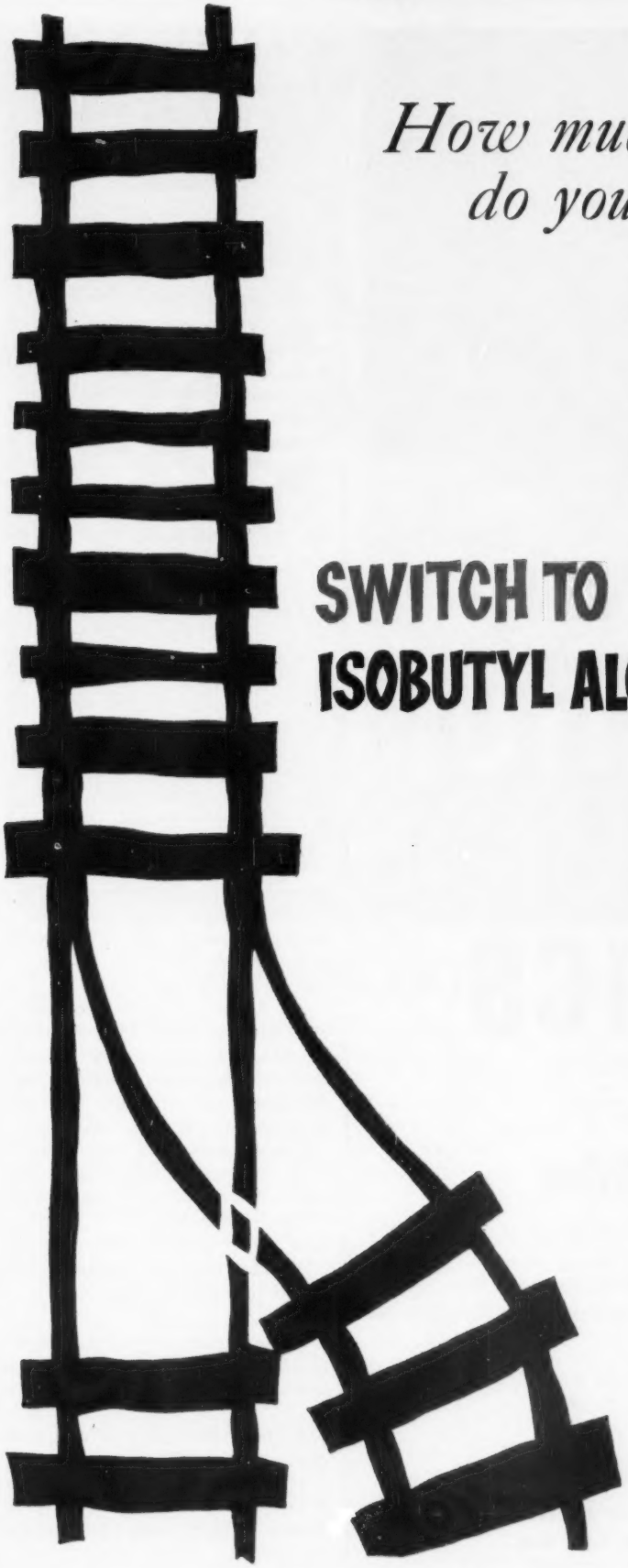
Pressure Transmitter: The Computran, a new unit for transmitting low-pressure measurements, is now available from Computer Components Division, International Resistance Co. (401 North Broad St., Philadelphia 8). A simple electromechanical system is claimed to eliminate linkages



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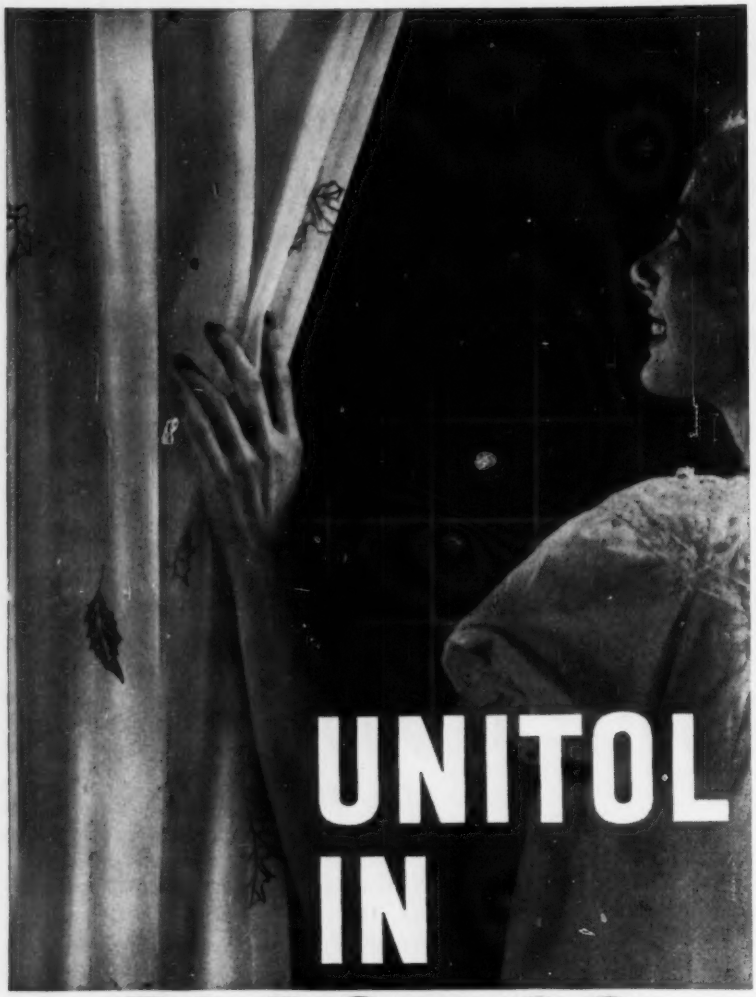

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Spray Gun: A new Plasmatron spray gun said to extend the range of sprayable refractory materials in available from the Giannini Plasmadyne Corp. (3839 South Main St., Santa Ana, Calif.). Materials such as titanium carbide, tungsten, chromium and titanium can be deposited on virtually all ceramic base materials and metals without metallurgical, crystallographic or chemical changes, the firm says. The 4-lb. hand-held gun operates on gases such as argon and nitrogen.

•

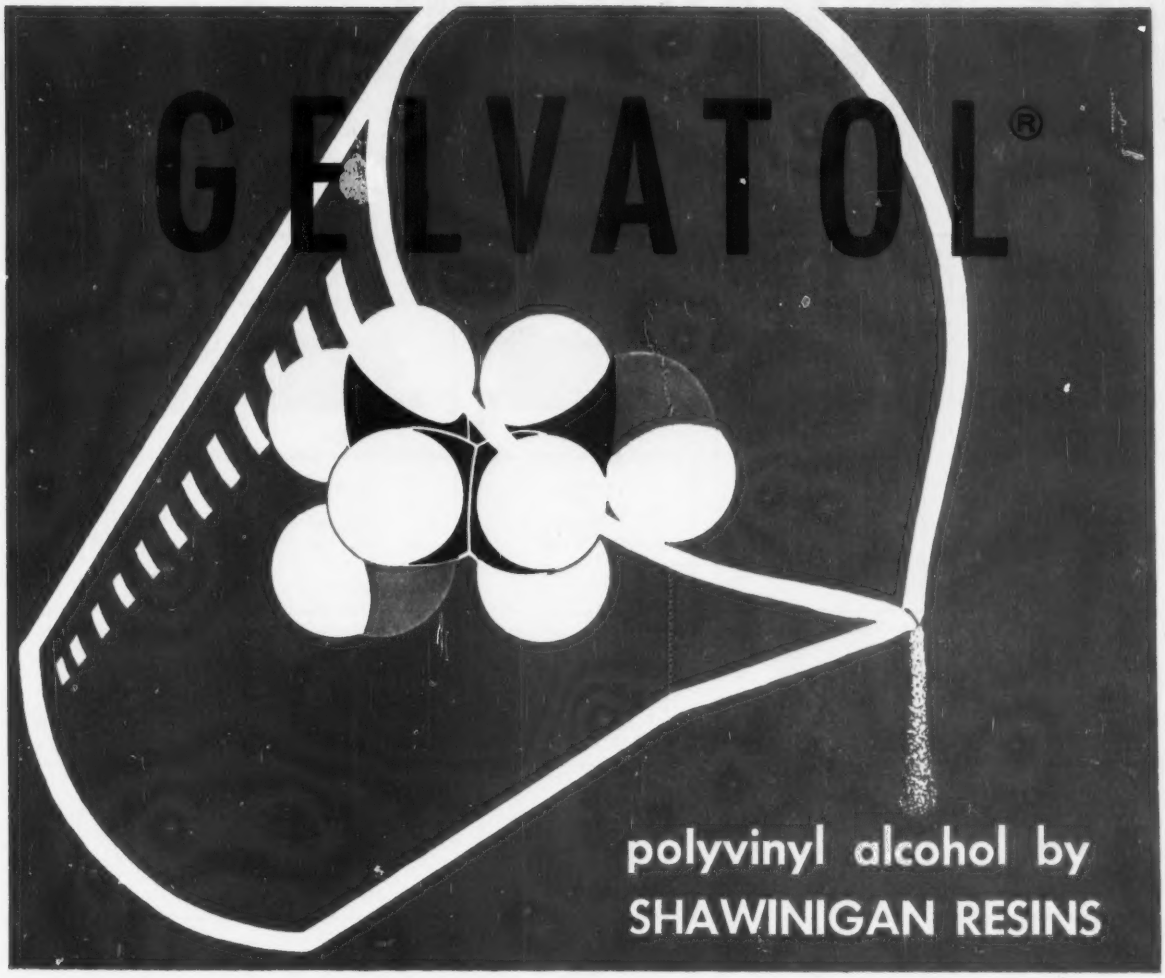
Timer: The Servo-Gauge oscillator, a pneumatically actuated timer for controlling the speed of diaphragm pumps, controlling cylinder or diaphragm-operated valves and other automatic equipment, is now available from Associated Control Equipment, Inc. (Coraopolis, Pa.). The timer has no moving parts and is designed for explosive-hazard areas and remote field installations. It operates on 30 psi. of clean air or noncorrosive gas, sends out a predetermined repetitive signal impulse at a frequency variable from 0.3 to 60 cycles/minute.

•

Air Sampler: The Gelman Instrument Co. (106 North Main St., Chelsea, Mich.) is out with an air sampler that collects samples of minute concentrations of radioactive particles, toxic metals, and dust contaminants. The high-volume sampler is powered by a turbine with an electric 0.5-hp. ac.-dc. motor. The unit weighs 9 lbs., including a 4-in. sampling head, can be used at rates up to 100 cfm. The motor is independently cooled to prevent burnout.

•

Psychrometer: A portable, rapid-reading thermistor psychrometer is now available from Atkins Technical, Inc. (1276 West Third St., Cleveland 13). The battery-powered instrument gives a reading in less than 10 seconds in temperatures ranging from 10 to 176 F. Accuracy is within 0.5% of relative humidity and readability is within ¼ F.



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GELVATOL CHARACTERISTICS

Resin Type	Viscosity, cps.	% Residual Polyvinyl Acetate	% Hydrolysis
1-90	55-65	0-2	100-99
3-90	45-55	2-4	99-97.9
20-90	35-45	19.5-24	89-86
1-60	28-32	0-2	100-99
3-60	23-28	2-4	99-97.9
20-60	21-25	19.5-24	89-86
1-30	4-6	0-3	100-98.5
20-30	4-6	19.5-21.5	89-87.7
40-20	2-3	37-42	77-72.9
40-10	1.3-2	37-42	77-72.9

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Dispersing Action	Excellent
Grease Resistance	Excellent
Abrasion Resistance	Good to Excellent
Effect of Organic Solvents	Negligible

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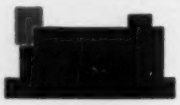
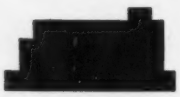
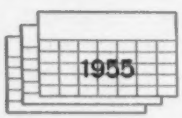
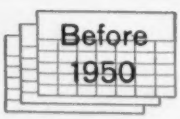
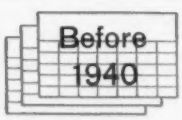
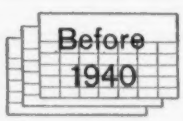
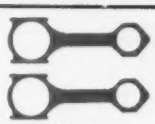
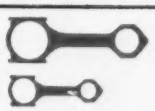
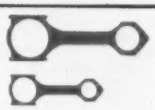
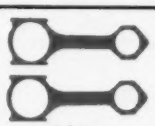
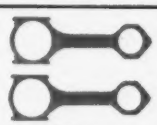
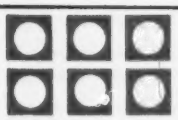
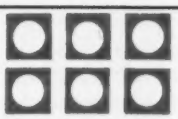
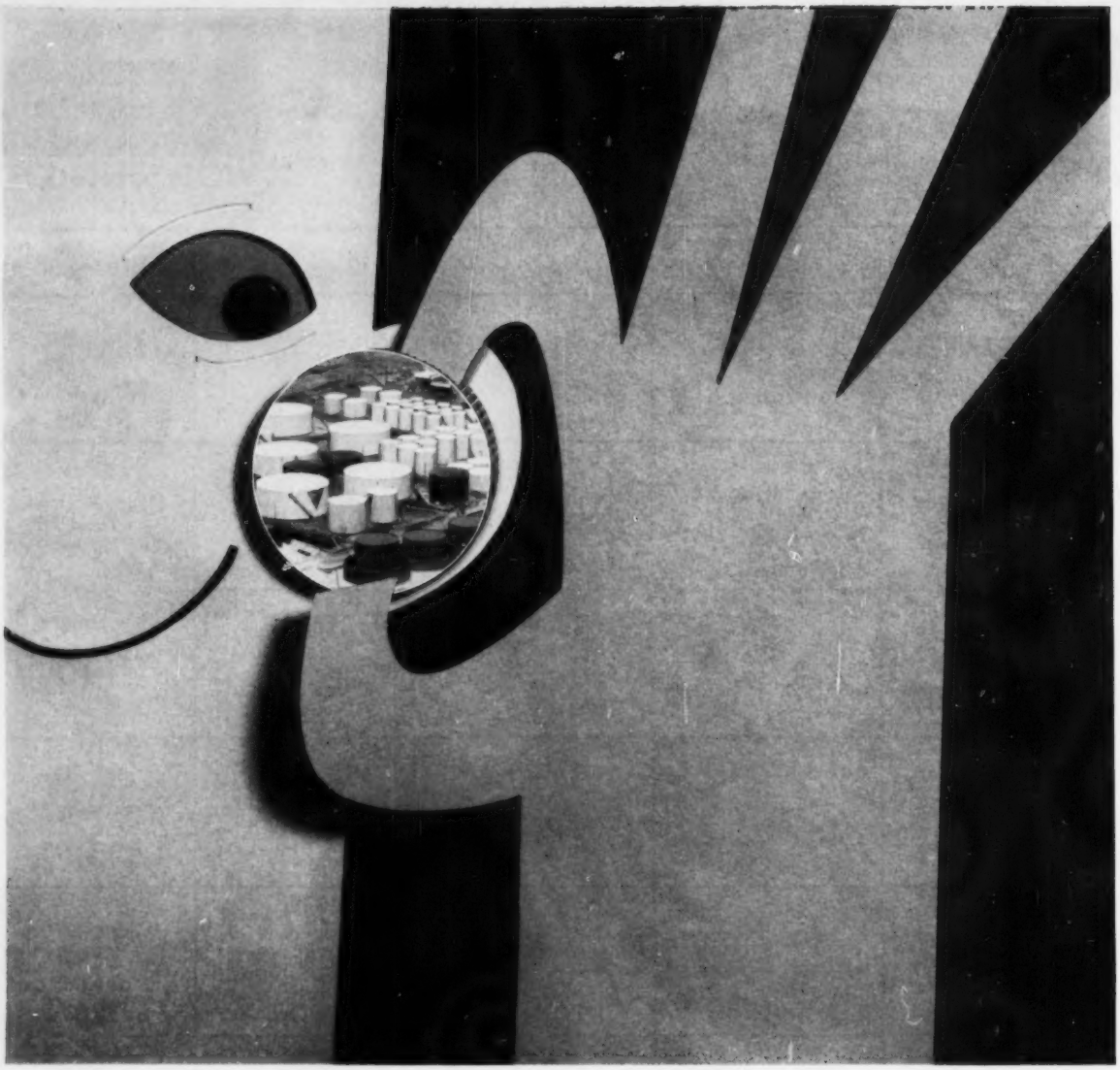
DESIGNED FOR TURBOCHARGING	 Yes	No	No	 No
SELF-SUSTAINED TURBOCHARGING	YES	NO	NO	NO
FUEL CONSUMPTION	7,000 BTU/BHP HR	9,000 BTU's	8,600 BTU's	8,500 BTU's
CYCLE	4	2	2	4
CYLINDER ARRANGEMENT	Inline	Inline	Vee	Vee
RPM	450	600	450	400
YEAR ENGINE WAS DESIGNED	 1955	 Before 1950	 Before 1940	 Before 1940
NUMBER OF DESIGNS TO COVER RANGE	1	2	2	2
LARGEST UNIT FOR SKID MOUNTING	950 HP	660 HP	1100 HP	660 HP

On these two pages you'll find a comparison of all the significant facts about gas engine compressors in the 375 to 950 horsepower range. We think you'll have to agree that Worthington's SLHC unit is the outstanding performer in its size range. Not only does it have 18% better fuel economy than the next nearest engine, but it also features self-sustained turbocharging, removable cylinder liners with cast-in water jacket, interchangeable power and compressor rods, and many other important engineering advances.

For complete details on the new SLHC engine compressor get in touch with your nearest Worthington district office. Or write to Worthington Corporation, Section 43-4, Harrison, N. J. In Canada: Worthington (Canada) Ltd., Brantfold, Ont.

WORTHINGTON

FEATURE	WORTHINGTON SLHC	MFR. A	MFR. B	MFR. C
MOUNT CYLINDERS ON BOTH SIDES	Yes	No	No	No
CYLINDER LINERS	Removable	Removable	NONE	NONE
INTERCHANGEABLE POWER AND COMPRESSOR RODS	Yes	 Yes	 No	 No
SIDE BY SIDE CONNECTING RODS	 Yes	 Yes	No	No
FRAME CONSTRUCTION	En-bloc	En-bloc	 Separate Cylinders	 Separate Cylinders
IGNITION	Twin	Single	Single	Single
RUNNING GEAR LUBRICATION	MANIFOLD CAST IN BASE	SEPARATE PIPE MANIFOLD	SEPARATE PIPE MANIFOLD	SEPARATE PIPE MANIFOLD
GASKET-FREE CYLINDER HEAD SEATS	YES	NO	NO	NO
RUNNING GEAR EASILY ACCESSIBLE	YES	NO	NO	NO



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- Avoid the capital expenditures of a tank storage terminal and its operation.
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- General American's warehouse receipts are accepted as the highest type of collateral.

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***Carteret, N. J. (Port of New York), Chicago Ill., Corpus Christi, Texas (Port of Corpus Christi), Pasadena, Texas (Port of Houston), Galena Park, Texas (Port of Houston), Good Hope, La. (Port of New Orleans).**

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Planning New Pigment Sales Strategy

GAF's Brouillard with Katz, Wich (center, right, below) map plans.

The men shown here, General Aniline & Film Corp.'s top pigments specialists, are this week setting up a new pigment sales department—divorcing this activity from its traditional position alongside dyestuff sales.

Masterminding the marketing changeover of this sizable segment of GAF's $145-million/year sales are Robert Brouillard, pigment sales manager and head of the new department; Leon Katz, pigment product manager; and Emil Wich, technical services manager. The assignment of these men underscores the emphasis now placed on research as the key to increased pigment sales. Brouillard and Katz are chemists with Ph.D.s and both are experienced in the research side of the business. Wich is a research chemist.

Involved in the change: creation of a new field sales force, reorganization of the headquarters staff, preparation of a new 500-page sales manual describing pigment uses, and a customer catalog containing a completely new nomenclature system for identifying and ordering GAF items.

Behind the Move: Reasons for GAF's move are twofold:

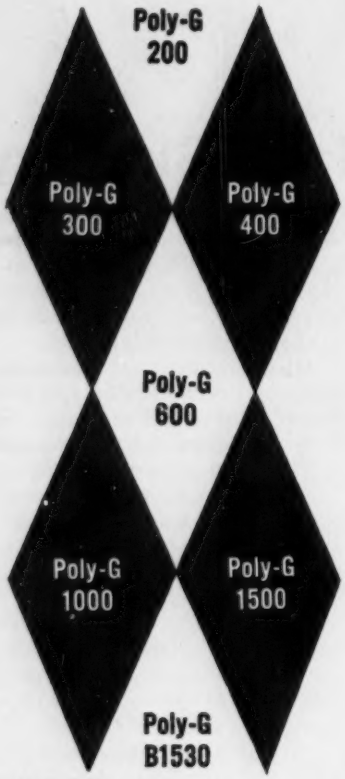
(1) Selling pigments has become increasingly complex—they are now finding their way into numerous relatively new applications ranging from embalming fluids to lubricating oils, in addition to the more traditional

'We'll get into any phase of the pigments business that's profitable.'

'Sales will be based on sound technical approach, problem definition.'

CW PHOTOS—ED WALLOWITCH

'We're making pigment names more meaningful to our customers.'



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Mathieson polyethylene glycols are shipped in tank cars, tank trucks and drums directly from the plant at Brandenburg, Kentucky, as well as from local distributors' stocks. Technical assistance when you need it is at your service.

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SALES

fields of inks, paints and rubber. Selling now requires the full-time efforts of salesmen who are specialists in the field. GAF's pigment sales have previously been handled by the company's dyestuff salesmen.

(2) GAF management realizes that if the company is to increase its pigment sales two and one-half times in 10 years—a stated company goal—it must concentrate on it to an extent greater than was possible under the previous sales arrangement.

Starting with a Problem: "Problem definition," says Brouillard, "always has been the weakest link in the customer-to-research service cycle. You can waste a lot of money when the customer's problem isn't c'early defined. We now feel we can give proper definition in terms our research people will understand."

Charged with conveying the customers' problems to the lab will be Emil Wich. He will provide technical services for the field salesmen and their regional managers and will be the liaison man between GAF's pigment service laboratory and the dyestuff laboratory. Wich and Leon Katz meet daily to tackle departmental problems.

Katz, as production manager, has three primary responsibilities under the reorganization: (1) to plan long- and short-range programs designed to make GAF (already among the top five U.S. organic pigments marketers) a top contender for pigment sales; (2) to provide liaison between research and development and marketing; (3) to provide budgetary control and initiate research projects within the limits of the budget.

Field Sales Organization: Says Brouillard, "We will get into any phase of the pigments business that will make money. Our scope is unlimited." To help GAF zero in on this broad target, Brouillard has set up a field-sales organization centered on three regional sales managers. The regional managers—Eastern (New York), Midwestern (Chicago), Western (San Francisco)—have direct-line control over the force of pigment salesmen, plus functional control over dyestuff salesmen selling pigments in those areas (such as in Houston) where pigment sales are not enough to warrant full-time pigments specialists.

Sales of pigments to the leather, textile and paper industries—areas of primary sales efforts in past years—still will be handled by dyestuff salesmen under Brouillard's functional control.

Foreign sales of pigments will, as in the past, be handled by GAF's export department; but here again, Brouillard will exercise functional control over salesmen merchandising pigments abroad.

New Designations: A major undertaking of the new sales department is the complete renaming of all GAF pigments. The nomenclature changeover now under way reportedly will cost $30,000-50,000, including the preparation of the elaborate customer's catalog (which costs about $90/copy). It does away with the long pigment names inherited from dyestuff practices, substitutes shorter and more meaningful numerical designations. Each pigment will have a six-digit number—first digit designates color; second, type; third, shade; fourth, additional properties; fifth, internal information such as place of manufacture); sixth, type of product (such as lake, toner, etc.).

The new catalog and the salesmen's manual are part of a series of new advertising and sales promotion tools to be readied for the new department. According to Robert Hamilton, advertising manager for GAF's Dyestuff and Chemical Division (of which Brouillard's department is a part), advertising and promotion for the new department will start from the ground and involve '60 expenditures of something like two and one-half times the current rate.

For the future, Brouillard sees big opportunities in pigment sales. Traditionally, the industry has increased about 4% annually. This will not diminish, might increase, and GAF clearly intends to get an increasingly hefty chunk of that business.

DATA DIGEST

• **Plastics Safety Handbook:** New 200-page handbook covers safety problems in the plastics processing industry. Topics covered include fire prevention, health and hygiene, inspection, safety planning, accident cause analysis, keeping of accident records, good housekeeping, materials handling, maintenance, and machinery. Society of the Plastics Industry

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Good reasons
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Listed at right are the industrial chemicals we produce for your use. They are manufactured in industry's most advanced petrochemical plant under uncompromising quality control. Delivery from Lima, Ohio, is swift and dependable. Technical service and laboratory help is readily available at all times.

But, frankly, other suppliers of these chemicals have a similar story to tell. The real difference with Sohio is a genuine eagerness to serve your needs. You'll discover it when you talk with the "man from Sohio." His first interest is "how can we help you?" It's a spirit of service that goes throughout the Sohio organization . . . sales people, technical experts, tank truck drivers who handle unloading.

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Sohio prilled chem-grade urea:
Free-flowing, non-caking prilled urea of highest purity. Excellent storage and handling characteristics. 100-lb. multiwall bags by truck or rail.

Anhydrous ammonia:
Refrigeration and commercial grades. Shipped in 17-ton high-pressure steel trucks or insulated 26-ton capacity high-pressure tank cars.

Aqua ammonia:
A-grade, delivered in 6,000-gal. pump-equipped truck transports. Sohio driver handles unloading. Also shipped in 8,000- or 10,000-gal. tank cars.

83% ammonium nitrate solution:
Shipped hot in heavily insulated aluminum tank cars holding 10,000 gals. and equipped for 35 psig.

Nitric acid:
40° Be' and 42° Be'. Sohio safety-trained driver handles delivery from stainless steel self-unloading transports. Shipped in tank cars, too.

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19-59

LUMMUS

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ST. PAUL AMMONIA PRODUCTS, INC., PLANT OPERATING ABOVE DESIGN CAPACITY

Ammonia Plant—Designed, Engineered and Constructed by Lummus—Feeds Natural Gas or Butane

The St. Paul Ammonia Products, Inc., plant at Pine Bend, Minnesota, has been operating continuously at rates above the design capacity of 200 tons per day of ammonia. Lummus' policy of close cooperation with the client at every stage was followed at St. Paul Ammonia. Lummus' extensive experience in plant design and construction has been effectively combined with the experience in plant operation of St. Paul Ammonia's capable staff in order to achieve a successful project.

In addition to producing anhydrous ammonia and ammonium nitrate solutions for the fertilizer industry, St. Paul also produces anhydrous ammonia meeting industrial specifications.

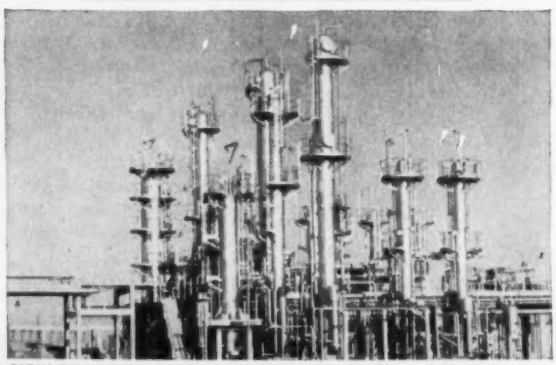
The Texaco Synthesis Gas Generation Process is employed to produce hydrogen for ammonia synthesis. Natural gas direct from the pipeline is normally used as the raw material. However, during the cold Minnesota winters the supply of natural gas is subject to interruption when preference is given to household users. The plant is designed so that at these times butane is used as the raw material.

The large compressors are gas-engine driven and use natural gas fuel except during the winter months, when propane from storage tanks is employed. The Lummus design fits the plant to the needs of the area and permits this sort of flexible operation.

This plant utilizes a hot potassium carbonate system for removal of CO_2 which helps reduce production costs.

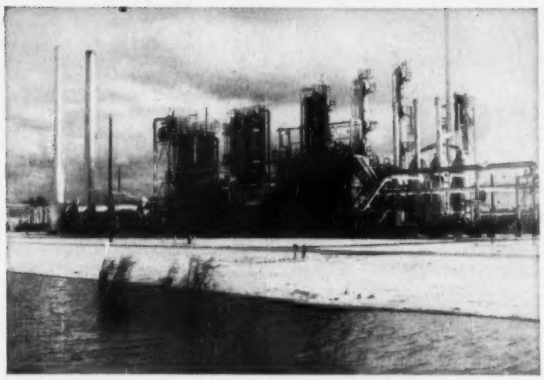
Lummus acted as general contractors for the entire project which includes ammonia synthesis, nitric acid, and ammonium nitrate solutions units, and offsite facilities including utilities, tankage and product shipping.

Lummus has experience in design and operation of ammonia plants utilizing natural gas, heavy fuel oil, butane, and waste chlorine cell hydrogen. Capacities of Lummus built ammonia plants range from 60 to 300 tons per day.



NEW BELGIAN PETROCHEMICAL COMPLEX. Lummus has successfully completed engineering and construction of a large group of petrochemical plants, some of which are shown above, for the SOCIETE CHIMIQUES DES DERIVES DU PETROLE-PETROCHIM at Antwerp, Belgium. The complex consists of a phenol acetone plant built to the process designs of The Distillers Company, and cumene and tetramer units whose design and construction are in accordance with the processes of Universal Oil Products Company. The phenol acetone plant is the second in a succession of three such plants built or being built by Lummus in various countries.

Lummus designs, engineers and constructs hydrogen feed gas facility for Air Products, Inc.



WORLD'S ONLY LARGE TONNAGE PLANT PRODUCES LIQUID HYDROGEN FOR USE AS MISSILE FUEL

The world's only large tonnage liquid hydrogen facility — near West Palm Beach, Florida — has been put on-stream by Air Products, Inc. of Allentown, Pennsylvania. The Lummus-designed, engineered and constructed hydrogen production section of the plant has been producing at over-design rate and at 99+% purity (better than design) since the test run was successfully completed 21 days after the initial operation of the gas generators.

The hydrogen production section combines Florida crude oil, oxygen and water to generate hydrogen gas.

Liquid hydrogen product from the new facility assumes an increasingly vital role in the nation's defense system. New capability in handling, storing and firing liquid hydrogen in rocket engines substantially improves our nation's position in the race for missile and space superiority.

Lummus has completed a number of gas generation units in recent years, and also has extensive experience in design, engineering and construction of plants for ammonia synthesis.

In the past 50 years, Lummus has built over 800 plants to produce petrochemicals, chemicals and petroleum products. If your company is planning facilities of this kind, discuss your plans with Lummus.

Over a half-century of Process-Industry experience

Here is just a partial list of chemicals for which Lummus has designed, engineered or constructed plants:

Acetone	Dichlorethane	Nitric acid
Acrolein	Dichlorobenzene	Phenol
Allethrin	Di-isobutyl alcohol	Phthalic anhydride
Ammonia	Ethylbenzene	Polyvinyl alcohol
Ammonium nitrate	Ethyl chloride	Polyvinyl pyrrolidone
Ammonium sulfate	Ethylene	Propargyl alcohol
Benzol	Ethylene glycol	Propylene
Beryllium metal	Ethylene oxide	Pyrrolidone
Bisphenol	Epon® resin	Styrene
Butadiene	Formaldehyde	Sulfuric acid
Butanediol	Heavy water	Surfactants
Butynediol	Hydrogen	Tetramer
Butyrolactone	Hydrogen sulfide	Trichlorethylene
Carbon black	Isopropyl alcohol	Trichlorobenzene
Caustic soda	Lamp black	Toluene
Chlorobenzene	Magnesium sulfate	Uranium oxide
Cumene	Mercuric nitrate	Vinyl acetate
Di-ammonium phosphate	Naphthalene	Vinyl pyrrolidone

Discuss your next chemical or petrochemical project with a Lummus representative.

THE LUMMUS COMPANY, 385 Madison Avenue, New York 17, N. Y.; Houston, Washington, D. C.; Montreal, London, Paris, The Hague, Maracaibo. **Engineering Development Center:** Newark, N.J.

New Developments in Paper Production Discussed in Article by Lummus Consultant

(Reprints available)

Noting that the per capita consumption of paper in this country has increased 333% in the last 35 years, Mr. A. P. Schnyder, a Consulting Engineer for Lummus, has described in a recent article the many new processes and equipment and installation designs that have made it possible for the pulp and paper industry to meet this increased demand.

Some of the new developments discussed in the article include: cold soda, neutral sulfite semi-chemical, and chemigroundwood pulping processes which broaden the pulpwood supply to include hardwoods; the introduction of chlorine dioxide as an added bleaching agent to increase pulp brightness to over 90%; and the variety of digester assemblies devised to convert from batch to continuous operation. Copies of the article can be obtained from Lummus.

Increased demand leads GAF to expand facilities for Acetylene Derivatives

Increasing demand for its new acetylene derivatives has led General Aniline & Film Corporation to expand its production facilities at Calvert City, Kentucky. GAF has awarded the contract for the expansion project to The Lummus Company.

First Plant of Its Type

The original plant, completed three years ago by Lummus, was a pioneering achievement of design, engineering and construction; it was the first plant for full-scale commercial production of high-pressure acetylene chemicals built in the U. S. A.

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SALES

(in cooperation with National Safety Council), 250 Park Ave., New York.

• **Acrylic Monomers:** Folder furnishes prices, properties and specifications of line of cross-linking acrylic monomers. Among them: diallyl fumarate, cyclohexyl methacrylate, allyl methacrylate, and dimethacrylates of ethylene glycol, triethylene glycol, tetraethylene glycol, polyethylene glycol. Sartomer Resins, Inc. (Essington, Pa.).

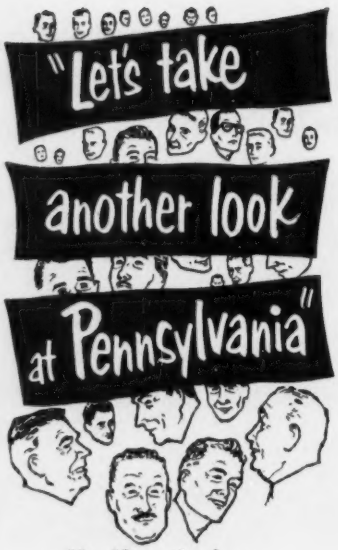
• **Epoxy Resin:** Technical bulletin describes new resorcinol-based epoxy resin now available in development quantities. Bulletin discusses chemical and physical properties, reactivity with curing agents, curing systems, storage stability, pot life, and applications. Producer claims highest epoxy concentration available in an aromatic diepoxide. Koppers Co. (Pittsburgh).

• **Company Catalog:** New 36-page booklet lists specifications and end-uses for more than 1,000 products. Categories included: monomers, polymers, resins, adhesives, coatings, fine chemicals, basic chemicals, organic intermediates and biochemical reagents. Directory also mentions company plants and warehouse locations, sales and service centers, and overseas manufacturing subsidiaries. Dept. H, The Borden Chemical Co. (New York).

• **Vinyl Copolymers:** Bulletin describes new types of vinylpyrrolidone-vinyl acetate copolymers. Originally introduced in 50% ethanol solutions, these materials are now available in various forms (solid, emulsion, solution) and in several monomer ratios. Applications include cosmetics, adhesives, antitarnish coatings. Antara Chemicals Division, General Aniline & Film Corp. (New York).

• **Silica Aerogel:** Technical-data sheet describes chemical and physical properties of silica aerogel for use in surface-coating applications with nitrocellulose and vinyl lacquers. Inorganic Chemicals Division, Monsanto Chemical Co. (St. Louis).

• **Chemical Cleaning Agents:** Technical bulletin furnishes basic property and use data on chemical cleaners. Applications discussed: bottle washing, alkaline derusting and paint stripping, cleaning aluminum (both pure and alloys), cleaning of stainless steel, general chemical cleaning. Chemical Sales Division, Chas. Pfizer & Co. (Brooklyn 6, N.Y.).



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666 PLANT EXPANSIONS

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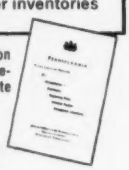

Pennsylvania Department of Commerce

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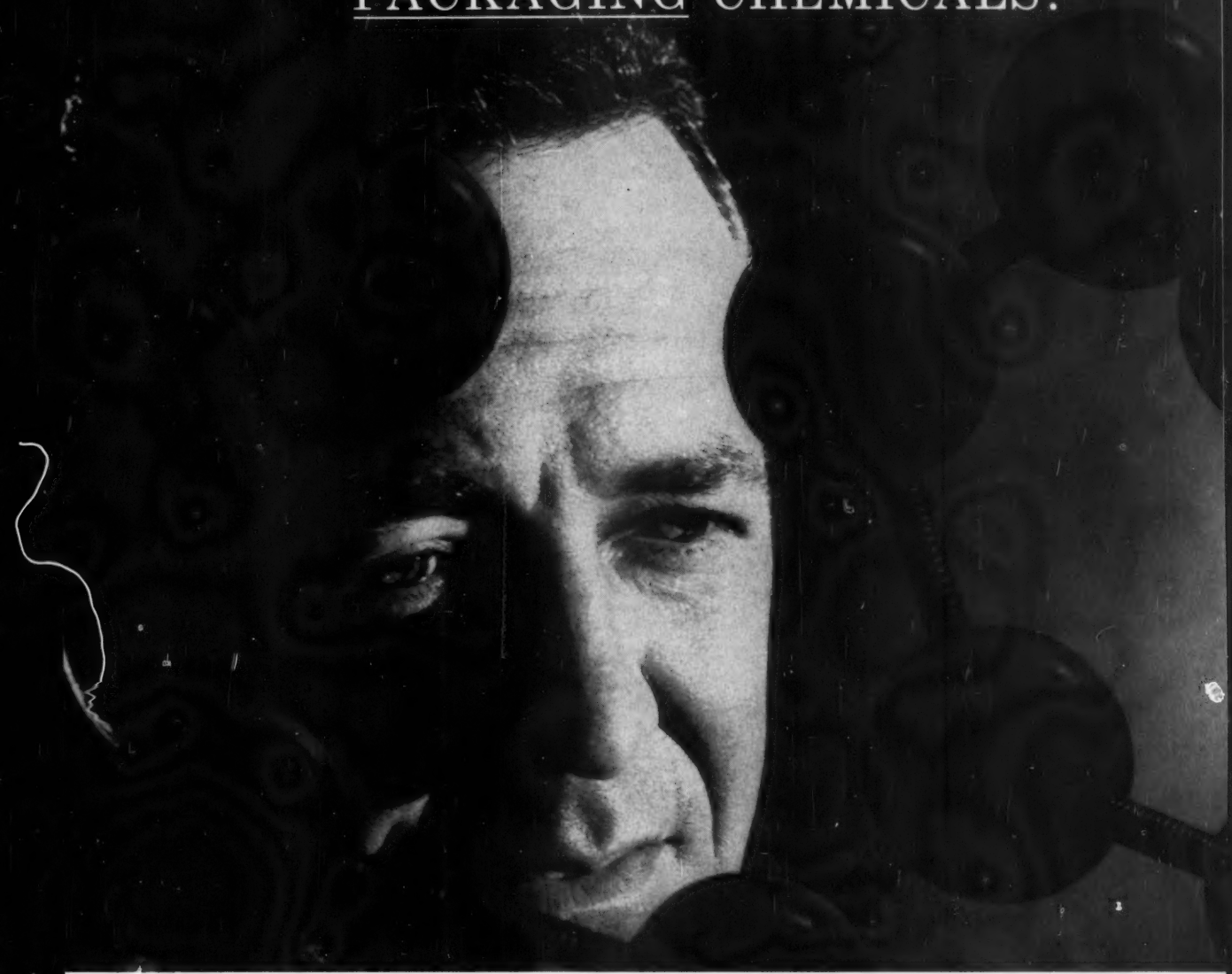
Phone: CEdar 4-2912

WHAT SHOULD I KNOW ABOUT PACKAGING CHEMICALS?



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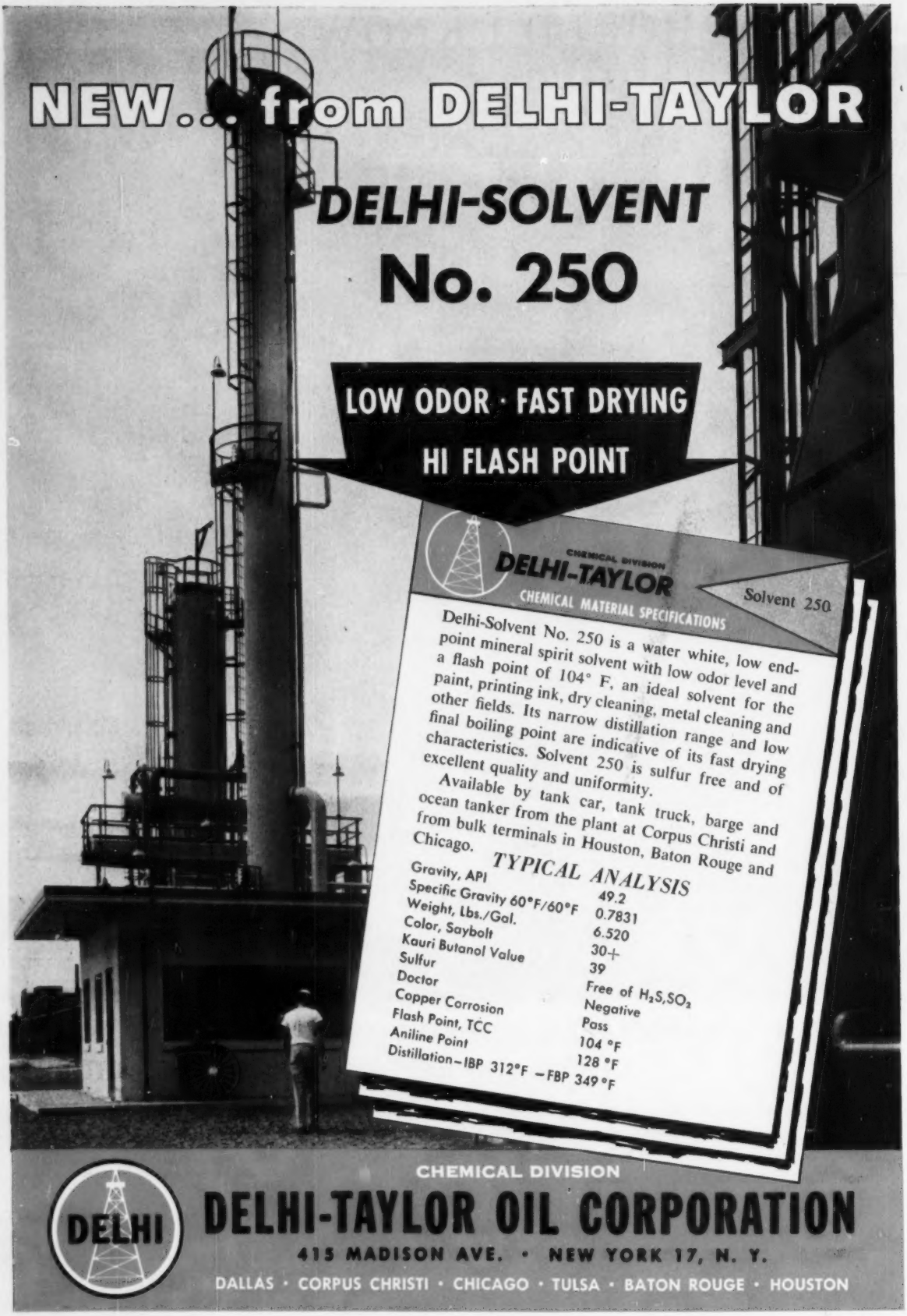
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Specific Gravity 60°F/60°F 0.7831
Weight, Lbs./Gal. 6.520
Color, Saybolt 30+
Kauri Butanol Value 39
Sulfur Free of H_2S,SO_2
Doctor Negative
Copper Corrosion Pass
Flash Point, TCC 104 °F
Aniline Point 128 °F
Distillation–IBP 312°F –FBP 349 °F
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Technology
Newsletter

CHEMICAL WEEK
December 5, 1959

A new catalytic cure for nitrogen oxides in automobile exhaust was suggested this week by Franklin Institute Laboratories. Key: use of chromite catalysts to promote reduction of the nitrogen oxides by the carbon monoxide in exhaust gases. This approach differs, says FIL Director Nicol Smith, from most previous smog-control methods, which rely on catalytic or noncatalytic oxidation of the residual hydrocarbons.

FIL researchers have achieved better than 90% reduction of nitric oxide by the use of such catalysts as zinc-copper chromite, iron chromite, barium-promoted copper chromite and chromium-promoted iron oxide. These materials can also induce oxidation of more than 90% of the hydrocarbons and carbon monoxide, says Smith, provided sufficient oxygen is present. Added advantage: chromites eliminate need for auxiliary equipment, such as pumps commonly required to supply additional air for oxidation.

FIL is continuing its smog-control studies under the sponsorship of the Air Pollution Foundation of San Marino, Calif., will next study the effects of chromite poisoning by lead and other exhaust constituents.

•

Another approach to the smog problem is a new combustion system said to cut exhaust hydrocarbons by two-thirds, give 15% better fuel economy and operate on any grade of gasoline or jet fuel. It's called the RAM Straticharge Combustion System, is the invention of Ralph M. Heintz, retired partner of Jack and Heintz, Inc., Cleveland aircraft equipment firm.

The system uses continuous fuel injection, operates on an extremely lean fuel-air mixture (about 30 parts air to one part fuel). Combustion in the presence of a large amount of oxygen is said to reduce unburned hydrocarbons to about 2% of original fuel weight, compared with about 5% in carburetor systems.

Key to the system: a small precombustion chamber that fits into the engine's spark-plug well. Under light operating loads, fuel and air are pumped only into the small chamber. The spark plug ignites the mixture and it explodes into the main cylinder. Under heavy loads, additional fuel and air are pumped into the cylinder. Estimated cost of converting the regular dome-head engine: about $300.

One engine is under test at Stanford University, another at Chrysler. Food Machinery and Chemical Corp.'s Ordnance Division (San Jose, Calif.) has made Defense Dept. inquiries about installing RAM-modified engines in experimental military vehicles.

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The list of Dutch firms making synthetic diamonds continues to swell. Asscher's, an Amsterdam diamond cutter, reveals it has applied for

a patent. This comes on the heels of De Beers' patent-filing disclosure (*CW Technology Newsletter, Nov. 28*) and General Electric's process-details disclosure (*CW Technology Newsletter, Nov. 21*).

Asscher's won't reveal details, but says its process is based on a system of "guided" explosive charges that enable the necessary high pressures to be attained. The firm says the process is not like GE's and that its experimental work is "entirely independent" of synthetic-diamond research now in progress at two other Dutch firms: N. V. Bronswerk (Amsterdam) and Philips (Eindhoven). Asscher's says it won't call its new material "diamond," purposely prefers to refer to it as "man-made hard materials from graphite."

•

A new cancer drug is being marketed by Mead Johnson & Co. (Evansville, Ind.). Called Cytoxan, it is a palliative—not a cure—for certain types of cancer, features greater effectiveness and lower toxicity than nitrogen mustard. Generically, the drug is cyclophosphamide, originally synthesized by Asta-Werke AG (Brackwede, West Germany).

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The world's largest underground coal-gasification plant started operation last week at Russia's Angrenski coalfield. Coal reserves, estimated at more than 45 million tons, were ignited by high-voltage electric current, are expected to supply more than 2 billion cubic meters of gas annually to the Angrenski thermal power station nearby.

•

A new statistical approach to process optimization was unveiled this week by F. E. Satterthwaite of the Statistical Engineering Institute (Wellesley, Mass.). Dubbed REVOP—for random evolutionary operation—it combines the speed and simplicity of the random balance technique (*CW, March 22, '58, p. 79*) with the pinpointing accuracy of evolutionary operation methods (*CW, Oct. 24, p. 75*). Chief advantage: rapid optimization with a minimum number of experiments. Satterthwaite reports that, to date, REVOP has never failed to produce at least 90% of the possible improvement from fewer than 20 tests.

•

An enzyme mixture to help fatten cattle and sheep is getting urgent research at various universities (e.g., Iowa State College at Ames) and experiment stations. It's still not available commercially, but will likely be used in feed supplements. Agrozyme, as it's tagged, is produced by Merck & Co., Inc. (Rahway, N.J.), and reportedly increases weight gains, improves appetite, results in feed savings and better beef quality.

Success of the newcomer could help boost industrial enzyme sales, estimated at $100 million/year, and currently on the upswing (*see p. 73*). Early tests have involved Agrozyme's use with corn. But further experiments on other grains, such as barley, are under way to determine just how the enzymes work and under what conditions they work best.

You'll find the ***BASICS*** you want at PCI

You may be seeking a new supply source for an established plant. Or perhaps you're searching for raw materials to launch new manufacturing operations.

If your plans include a need for any of a number of chemicals made from petroleum hydrocarbons, PCI may have just the raw material you need. And, at PCI you'll find these basics which can help you build success into your expanded operations:

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a growing research program aimed at developing new products for your future manufacturing endeavors;

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- compatible with a wide range of resins and plasticizers.

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Clinical Enzymes, Commercial and Under Study

Product	*Description*	*Supplier or Investigator*	*Use*
Chymotrypsin	Purified material extracted from mammalian pancreas	Armour Pharmaceutical (Kankakee, Ill.)	Relieves inflammation
Fibrinolysin	Purified material for intravenous infusion	Ortho Pharmaceutical (Raritan, N.J.)	Dissolves blood clots
Trypsin-chymotrypsin	Trypsin, chymotrypsin with antibiotics bacitracin, polymyxin B sulfate in ointment	Mowatt & Moore Ltd. (Montreal, Can.)	Treatment of wounds, dermatoses, ulcerations
Collagenase	Obtained from culture filtrates of *Clostridium histolyticum*	Agricultural Biologicals (Lynbrook, N.Y.)	Debridement of burns
Procollagenase	Extract of hog pancreas	Children's Hospital Research Foundation (Washington, D.C.)	Under study for removal of scars
Glycerophosphate dehydrogenase	An enzyme involved in carbohydrate metabolism in living cells	Merck Institute for Therapeutic Research (Rahway, N.J.)	Cancer research
Desoxyribonuclease	Extracted from pancreas glands	Parke, Davis (Detroit)	Under study for dissolving blood clots; cancer and mental research

Clinical Gains Brighten Enzymes' Prognosis

Thanks largely to research, makers of clinical and industrial enzymes expect to top this year's estimated $100-million sales in '60. Perhaps the fastest-growing segment: sales of clinical enzymes, which—though only totaling $4-5 million—are rising 8-10%/-year.

New therapeutic versatility (*chart*), freedom from side effects, and convenience in use, are big reasons for the optimism about clinical enzymes. Enzymes, in powder, solution, ointment, or tablet form, are joining the fray against maladies ranging from nerve root pain to mental disorders.

Convenience — in easier-to-use formulations — is seen as a major cause of growth, says Stanley Hier, research head of Wilson & Co., Inc. (Chicago). This year, Wilson began offering stable aqueous injectable enzymes, replacing its two-vial (enzyme and saline diluent) products. Now, says Hier, several "interesting" new animal-derived enzymes are under investigation.

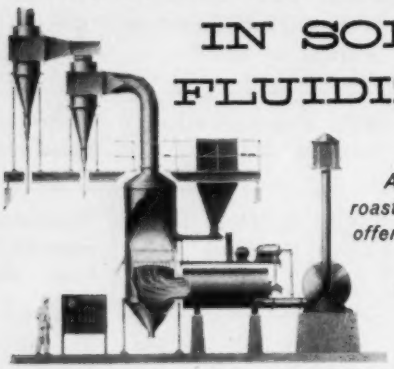
Relative freedom from side effects is a growth factor for clinical enzymes, says Armour Pharmaceutical Co. (Kankakee, Ill.) President Robert Hardt. However, when injected too rapidly, enzymes can stir up body reaction to foreign protein—anaphylactic shock. To counter this rare but serious condition, both Armour and National Drug (Philadelphia) have worked out so-called buccal enzyme preparations that are absorbed into the blood through the cheek.

Among other companies in the clinical enzyme field are Lederle, which pioneered Varidase (a combination of streptokinase and streptodornase) for combating inflammation and edema; Merck, Sharp & Dohme; Abbott; Wyeth; Parke, Davis; SchenLabs Pharmaceuticals; Schwarz Laboratories; and

Process Trends from DORR-OLIVER

A SERVICE TO THE PROCESSING INDUSTRIES

WHAT'S NEXT IN SOLIDS FLUIDIZATION?



A versatile drying, roasting and calcining technique offers opportunities in chemical processing. Here's a report on developments.

Since Dorr-Oliver first introduced the fluidization technique for non-catalytic applications more than ten years ago, our engineers have been constantly investigating its wide potentialities. From such well established operations as the roasting of sulphide ores, SO_2 production for acid manufacture, drying of fine coal and drying and sizing of lime stone, development is now extending into many fields of chemical processing.

The advantages of FluoSolids®, Dorr-Oliver's system for fluidized bed techniques, are its essential simplicity, its compactness, its low operating and maintenance costs, its ability to take wide feed variations and its inherent adaptability to precise temperature control with simple instrumentation. It has proved particularly effective in drying wet, sticky or otherwise difficult-to-handle materials. In some drying operations, the added benefit of classification by particle size is possible.

At D-O's research and development center, Westport, Connecticut, hundreds of test runs covering many possible new applications have been completed. Typical of these are the drying of heat sensitive polymers, hydrochloric acid and sodium sulphate production by the Hargreaves Process, drying of sodium chlorate crystals and potassium silicon fluorides, drying of chemical precipitates, roasting of furfural residues, and low temperature calcination of phosphates. Opportunities for still further development are far from exhausted.

To sum it up: if you want a continuous, high capacity method of drying or heat treating materials . . . if precise and completely uniform temperatures are needed to prevent, induce, or control chemical or physical action . . . if intimate contact of gases with solids is a necessary part of your processing . . . maybe the Dorrco FluoSolids System is your answer.

Chances are that our engineers have already been working on just such a problem as yours. If they haven't, the information and experience now available should at least provide a good starting point for investigation and evaluation. An inquiry costs nothing — and it may open up mutually rewarding opportunities. Dorr-Oliver Incorporated, Stamford, Connecticut.

Dorr-Oliver offers a wide range of equipment, methods and complete systems for the processing industries. Operations include:

ROASTING • DRYING • CALCINATION • CLASSIFICATION • THICKENING • SCREENING • FILTRATION • CLARIFICATION • WASHING • AGITATION • CENTRIFUGATION • ION EXCHANGE • PUMPING

a variety of other suppliers of specialty products.

Their products, in some cases, overlap. For example, Abbott, Armour, Ortho, G. D. Searle and Wyeth all offer hyaluronidase (in various forms), an enzyme prepared from mammalian testes, which helps hydrolyze connective tissues. It is useful in promoting the diffusion of solutions injected hypodermically, as in administering local anesthetic.

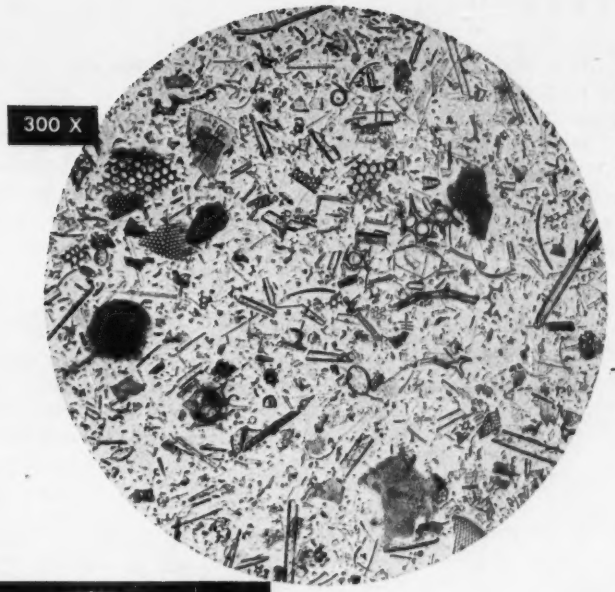
There's general agreement that a great deal of basic research is needed, particularly on the mechanism of enzyme action. For example, Armour's research director, James Lesh, believes knowledge of this kind will lead to quicker-acting, more efficient enzymes. Says Lesh, "Researchers could profitably find out more about why some proteins act as enzymes while others do not. Structural research would also help, since enzyme structures are very complex and usually are only 'approximately' determined."

An example of basic studies is recent research* on the metabolism of α-glycerophosphate in normal and malignant tissues by Edward Ciaccio and Joan Orange at the Merck Institute for Therapeutic Research (Rahway, N.J.). Their findings may lead to new anticancer agents.

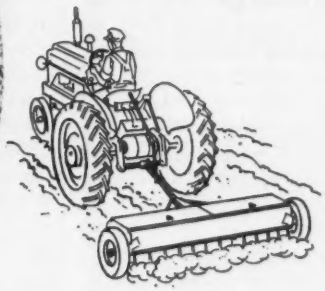
Glycerophosphate is normally present in living cells. But the Merck team found that it is absent or in very low concentration in about 30 types of cancer cells. This deficiency results from a deficiency of the enzyme glycerophosphate dehydrogenase. The latter is inhibited by lactic acid, an excess of which is found in cancer cells. Future research may reveal how to restore normal enzyme balance within the cell.

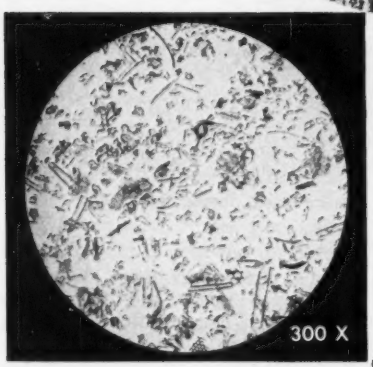
Volume Markets: Trypsin is perhaps the leading clinical enzyme in sales and use. It catalyses the hydrolysis of protein. But even its volume is far less than that of enzymes sold for industrial uses—leather bating, fruit juice clarification, and the like. Probably the largest enzyme producer, Rohm & Haas (Philadelphia) offers no clinical enzymes, although it pioneered the industrial field. Other important enzyme producers include Takamine Laboratory, Inc. (Clifton,

*This work was supported by the Cancer Chemotherapy National Service Center, National Cancer Institute, under the National Institutes of Health Contract No. SA-43-ph-1886.

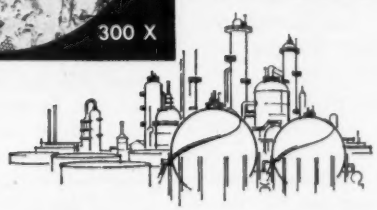


For fertilizer coating—Celite 379, a natural milled diatomite, provides the uniform conditioning needed to prevent caking of granular, mixed or prilled fertilizers—maintains good free-flow characteristics even after prolonged storage.

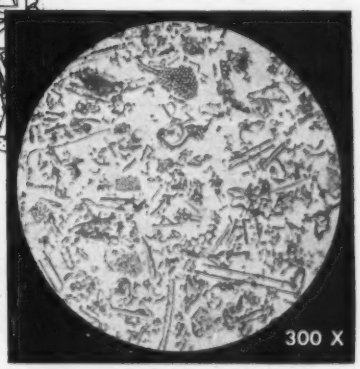




For catalyst carriers—Super Floss, finest particle size flux-calcined Celite grade, is used where a non-reactive porous silica support is needed. (Also available: special Celite supports in many preformed shapes for strength, high temperature stability, resistance to abrasion and attrition.)



As a paint-flatting agent—Celite 281, air-floated fines of flux-calcined diatomite, provides uniform and efficient flatting at low cost. Contributes to control of low angular sheen, durability, and faster drying.



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No matter which of the many available grades you choose, you can depend on a given volume of inert Celite* to retain its typical dry-powder characteristics even after absorbing its own weight of liquid.

Actually, Celite can absorb a total of more than twice its own weight. That's because a mass of the fine skeletal particles is approximately 93% air space or voids. Yet, in spite of this very high porosity, Celite is essentially non-hygroscopic.

Other unique properties—extremely high bulk, irregular particle shape and large available surface area—ideally suit Celite to hundreds of mineral filler applications. It is produced with precision from the world's purest commercially available diatomite deposit. It offers a wide choice of grades, each carefully controlled for complete uniformity.

For technical data on specific mineral filler or filtration problems, talk to your nearby Celite engineer. Or write to Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

*Celite is Johns-Manville's registered trademark for its diatomaceous silica products

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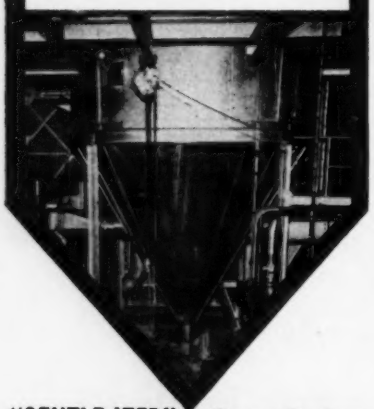

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N.J.), Wallerstein Laboratories (New York), Paul-Lewis Laboratories, Inc. (Milwaukee), Fermco Laboratories, Inc. (Chicago), and S. B. Penick & Co. (New York).

Fermco may be an exception in research concentration. It isn't too interested in clinical types, although it sells some trypsin. Instead, the firm is concentrating on opening up new markets for catalase and glucose oxidase as a preservative.

The Army Quartermaster Corps is reported to be enthusiastic about tests of Fermco's OxyBan packet, a porous packet that can be dropped into a food package to remove oxygen. It has kept whole powdered milk intact from a taste standpoint after a six-month, 90 F test; it may also have applications in preserving coffee, mustard, etc., from oxidation.

One gram of the OxyBan formulation removes 10 cubic centimeters of oxygen at standard conditions of temperature and pressure. Other potential uses are in vitamin formulation—e.g., maintaining stability of mixes of B_{12} and ascorbic acid and in inhibiting corrosion of delicate, expensive instrumentation.

Fermco and other firms interested in catalase (e.g., Paul-Lewis) are eagerly awaiting Food & Drug Administration approval of a milk sterilization process involving use of hydrogen peroxide to kill harmful microorganisms, followed by use of catalase to "destroy" residual peroxide. The method is applied in France, Spain, Italy and Germany, may find use in the U.S., first in preparing milk for cheese production. This one application alone could result in a million-dollar catalase market, Fermco Research Director Don Scott believes.

Sales Volume: Nailing down enzyme sales figures isn't easily done, for a variety of reasons. Enzymes are sold on the basis of activity — can command $15-16/lb. if very active. But because each company uses its own strength ratings, purchasing is complicated. While raw-material costs —especially on plant-derived proteolytic types—vary appreciably, fluctuations aren't reflected in enzyme prices —which are apparently high enough to ride out such cost changes. However, there are exceptions. Right now there is a world shortage of calf livers, source of rennet used in making cheese; and the price of rennet has been rising.

Improvement of enzyme production methods, discovery of new enzyme uses are both important to the industry. As costs drop and applications increase, enzymes figure to take on new stature in chemical and drug circles.

New Light on Budgets

The rule of thumb that research budgets are only slightly affected by variations in the business climate has received solid new statistical backing.

At the recent national meeting of the Operations Research Society of America, in Pasadena, Midwest Research Institute's Ira Horowitz concluded that the strongest influence on R&D budgets was previous expenditure in that field. Although business conditions and liquidity have some effect, they "rarely necessitated a 'cutback' philosophy during adverse conditions, and only slightly more frequently occasioned particularly heavy expenditure during upturns."

Horowitz' study, covering 41 large, prosperous companies (including 14 in the chemical process industries), disclosed a remarkably high annual rate of R&D budget growth, with the CPI companies' growth averaging about 15%.

Of the 14 in the CPI, only three failed to have higher rates of increase for research than for sales. Thus, the trend toward research taking a bigger part of the sales dollar each year is confirmed.

Using least-squares techniques to determine the coefficients in a linear equation expressing a series of hypotheses, Horowitz calculated which firms had significant correlation between the research budget and four variables: sales, liquidity (measured by profits), previous research expenditures and the presence or absence of an excess profits tax. Differences in effects of rising and falling sales and profits were also included in a second version of the equation.

In each case, the most common correlation was with the previous pattern of research spending in the company. The excess profits tax had no discernible relation to R&D budgets, while sales and profits appeared to have a nonlinear relationship. The effect of rising sales and profits was a

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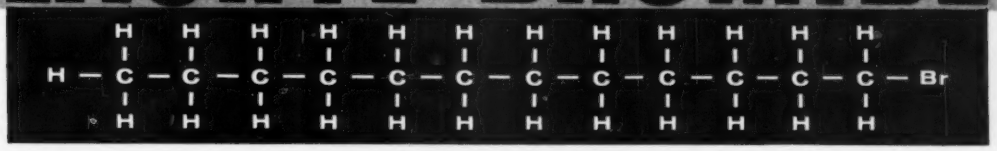

A practicable intermediate for the synthesis of quaternary ammonium salts with germicidal, cationic, and surfactive properties

INVESTIGATE THESE ADVANTAGES: Michigan Chemical's lauryl bromide contains less than 1% alcohol; is exceptionally light in color (Gardner index: 2 or under) with high clarity. This means negligible color or alcohol carry-over to the end product. Even with these unusual properties this material is offered at standard rather than premium prices. Combine these factors and you have a very interesting intermediate to work with in preparing quaternary ammonium compounds.

Specifically, our lauryl bromide is a mixture of straight chain primary bromides having 10 to 18 carbon atoms with the 12 carbon, or lauryl chain, predominating (approximately 60%). Lauryl bromide will undergo all the reactions possible with normal alkyl halides. In the formation of quaternary ammonium salts and other replacement and exchange reactions, however, the reactivity of the lauryl bromide will be greater than its chlorine analog. This will permit lower reaction temperatures — important when working with materials subject to heat discoloration or decomposition.

Michigan Chemical now offers lauryl bromide, Technical Grade, in large commercial quantities. Write us for samples, technical data, and prices and indicate your area of interest. We will also welcome your inquiry on the custom synthesis of other organic bromides.

Description:	Clear, colorless to pale straw-colored mobile liquid with a coconut odor and low volatility.
Grade:	Technical. Contains approximately 60% by weight of lauryl bromide with lesser amounts of decyl, myristyl, cetyl, and stearyl bromides. The starting alcohol for this product is derived from a typical coconut oil composition.
Typical Properties:	Molecular weight, calculated .....261 Specific gravity, 25/25°C .....1.026 Bromine content, % .....30.6 Boiling range, 5% to 95%, at 20mm Hg. .....151-208°C. Freezing point .....—15.5°C.

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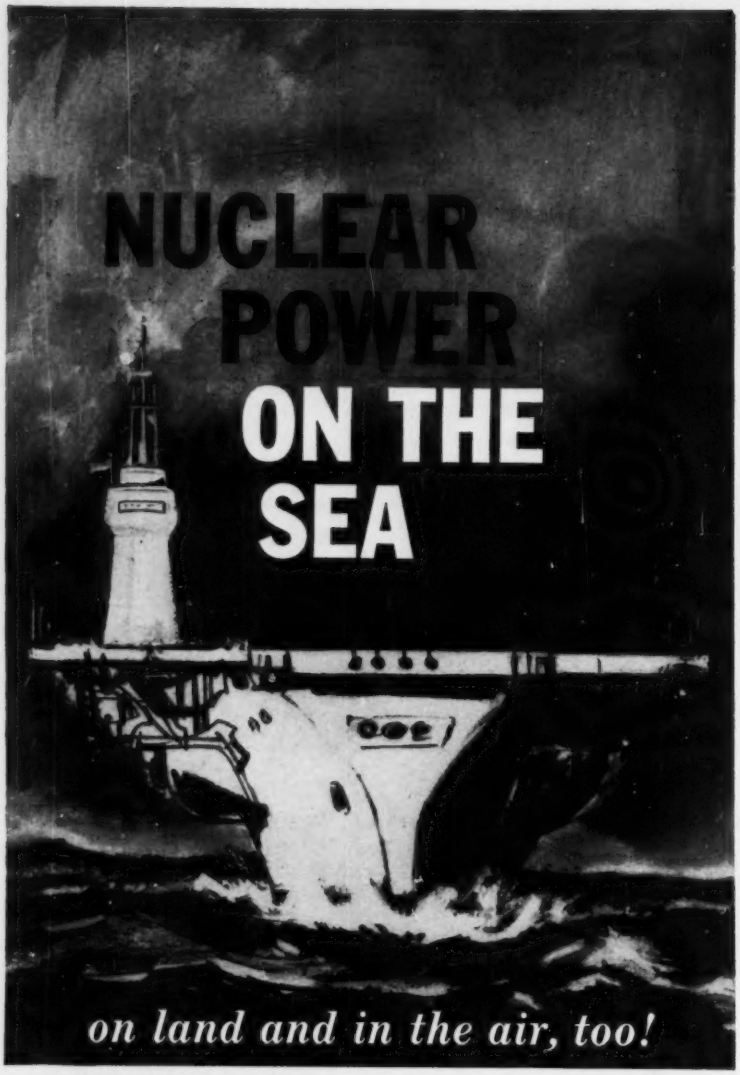

Another step toward economic nuclear power. Recent Vitro contributions to atomic propulsion include:

- **Consultation** on the A1W—basis for the nuclear aircraft carrier *Enterprise*
- **Engineering** the new high level examination laboratory for NRL, Washington, D. C.
- **Turn-key responsibility** for the CAMEN (Italian Navy) research reactor to be built in Livorno.

Here too, Vitro is making vital contributions as it has on land and in the air. Typical of these achievements are the Lockheed center at Marietta, Ga., where the first atom-powered plane is now being developed, and Con Edison's Indian Point, N.Y., nuclear station.

In today's modern technological areas, diverse nuclear and engineering skills are a necessity, not a luxury.

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RESEARCH

bit stronger than that of the falling figures.

As to the significance of the stable research budget, Horowitz remarked, "Research acts as a stabilizing influence on the broad category of 'investment' as a whole."

EXPANSION

- Schering Corp. has dedicated a $1.2-million quality-control center at Union, N.J. Ethical drugmaker Schering (steroids, antihistamines, tranquilizers) previously scattered its control operations at locations in Bloomfield, Union, and outside laboratories. The firm has included in the new Union facilities a laboratory to do research in improving analytical procedures.
- The Alloyd Corp. is moving into larger quarters at Cambridge, Mass., will retain present facilities in Watertown, Mass. The firm does R&D on new alloys, high-purity metals for space-age uses.
- Southern Dyestuff Co., a division of American-Marietta Corp., will build a $350,000 laboratory near Mount Holly, N.C. The firm is reputedly the world's largest manufacturer of sulfur dyestuffs, expects to complete the new research and development and sales service facility by late spring.
- The Toni Co., division of Gillette, has dedicated research laboratories in Chicago's Merchandise Mart. The new lab is believed to be the world's largest for research on hair and skin cosmetic products. Toni will budget $2 million for research in '60, its record expenditure for R&D to date.
- The Atlantic Division of Aerojet-General Corp. has dedicated a $150,000 laboratory and office building in Frederick, Md. Aerojet-General is a subsidiary of The General Tire and Rubber Co. (Akron, O.).
- Wah Chang Corp. plans a research center in connection with its Albany, Ore., light-metals plant but details of the facility have not been revealed.
- Du Pont de Nemours International S.A. has opened a new textile testing laboratory in Geneva, Switzerland. It's the second Du Pont lab opened in Europe this year. The first was the elastomers research lab at Hemel Hempstead, England.

M. A. Thompson (*left*), Wyandotte Eastern District Manager, and Purchasing Agent W. F. Merrilees, of West Virginia Pulp and Paper Company, discuss the firm's fast-growing chemical requirements. Periodic review like this is one reason Mr. Merrilees says:

"It's a pleasure to work with Wyandotte"

"From our dealings covering a long period of years, we would appraise Wyandotte as a very dependable source for chemical raw materials," states W. F. Merrilees, Purchasing Agent, West Virginia Pulp and Paper Company, New York, N.Y.

"Wyandotte puts the customer's requirements first . . . is always on the job when we need them with helpful technical service. Wyandotte is research-minded, too . . . their products are uniform and of high quality. Over the years, they have demonstrated that they can grow with our needs. It's a pleasure to work with them."

Have you discussed your requirements for chemical raw materials with a Wyandotte representative lately? If not, next time he calls, give him the opportunity to show you how Wyandotte's expanded facilities and multi-plant operations may be of greater service to you. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in principal cities.*

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Market Newsletter

CHEMICAL WEEK
December 5, 1959

Benzene prices are up 3¢—now stand at 34¢/gal. The increase, posted last week by Gulf Oil, will be followed by other sellers, even though supplies—which were shortest a couple of weeks after steel operations resumed—are now improving. Nonetheless, benzene experts foresee a continuing general tight supply situation until mid-'60, possible easing in the third quarter. This forecast assumes, of course, no further letup of steel production. If the strike were resumed, benzene buyers would be in a real pickle.

Export sidelight on the benzene shortage: Foreign benzene buyers who now are unable to get supplies from the U.S. are complaining loudly. Industry people here consider this a clear indication that foreign buyers needed U.S. benzene a lot more than they let on when it was freely available.

Meanwhile, there is little indication that there are sizable benzene imports—except possibly some continuing receipts by U.S. firms that have been buying benzene under contract with firms in Communist countries.

•

No toluene price hike is in sight, and petroleum-toluene marketers are unhappy about it. Their complaint is against the 25¢/gal. delivered price, allegedly forced on the industry some time ago by producers of coke-derived toluene. There's strong criticism that the steel producers who promised this delivered price are not living up to their commitment, sell at this price only when freight conditions make it convenient.

Meanwhile, chagrined petroleum-toluene producers are matching the continuing 25¢ price of coke toluene, delivering up to points where sales are unprofitable. And since there's no supply pinch on toluene (it becomes short only when there is a sudden large demand for use in aviation gasoline), a price increase on petroleum toluene isn't likely.

However, a spokesman for a major steel company denies the allegation that there is hedging on toluene sales, insists that the 25¢/gal. tab applies to all purchases anywhere in the U.S. He says that in practice the solvent is being shipped throughout the country. Incidentally, the steel industry's benzene-toluene output will be back to full-capacity rate this month.

•

Plastic materials are taking over more rubber markets **(see p. 22).** Goodyear Tire and Rubber Co. revealed this past week that it will discontinue manufacture of rubber flooring materials, will switch exclusively to making vinyl products. (It will also turn out vinyl countertops, wall coverings.)

Coinciding with this market switch is Goodyear's completion of a multimillion-dollar expansion that doubles the firm's capacity of

vinyl floor products. Strong consumer preference for vinyls, it's noted, show up in sales figures. In the first nine months of '59, sales of Goodyear vinyl flooring materials were up 20% over the same period of '58.

•

A competitive edge in vinyl acetate monomer distribution—that's what prompted Air Reduction Chemical to put up a new bulk storage plant at Port Richmond, Calif. The firm believes it is the first of its kind in the San Francisco Bay area.

To provide immediate delivery service, the installation stores 25,000 gal. of high-purity monomer brought directly from Airco's 90-million-lbs./year plant in Kentucky. (The company also maintains a bulk storage unit in southern California—at Vernon. Capacity is about half that of the newer facility.)

•

A $31-million Crown Zellerbach paper mill at St. Francisville (near Baton Rouge, La.) is in full production. Initial output of magazine paper is consigned to Time, Inc., at Chicago, with whom CZ built the plant as a joint venture.

•

Contracts to sell 47.7 million lbs. of DDT to the government have been awarded to six firms by the General Services Administration. Average price works out to a little more than 26¢/lb.

GSA will buy at least $9.4 million worth of the pesticide by next June 30, has an option to either increase or decrease actual poundage purchases by 25%. Sales could total $12.5 million. The DDT is earmarked for the International Cooperation Administration's worldwide malaria eradication program.

Winner of the top contract again (*CW Market Newsletter, Dec. 6, '58; April 18, '59*) is Montrose Chemical of California. Minimum dollar volume for each firm: Montrose, $4.67 million; Olin Mathieson, $1.7 million; Allied Chemical, $1.42 million; Diamond Alkali, $700,000; Geigy Chemical, $530,000; Lebanon Chemical, $310,000.

Poundages awarded (not directly related to above prices and subject to 25% increase or decrease): Montrose, 24 million lbs.; OM, 8.65 million; Allied, 7.2 million; Diamond, 3.6 million; Geigy, 2.7 million; Lebanon, 1.6 million lbs.

SELECTED PRICE CHANGES—WEEK ENDING NOVEMBER 30, 1959

	Change	New Price
UP		
Cocoa butter, bgs.	$0.01	$0.64
Candelilla wax, refd., bgs.	0.03	0.60
DOWN		
Corn oil, crude, tanks	$0.00125	$0.11125
Mercury metal, 76 lb. flask	1.00	215.00
Ouricury wax, crude, bgs.	0.05	0.63

All prices per pound unless quantity is quoted.

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Cardis Polymer #10	212-216	0-1	1-1½	8-10	25-30	Polymer
Cardis Polymer #8℗	205-210	1-2	3-5	7-10	24-28	Polymer
Cardis 935	210-214	2½-3	1-1½	16-18	38-42	Polymer
Cardis One℗	195-200	1-2	4-5	12-16	45-55	Emulsifiable Petroleum Wax
Cardis 314®	184-189	4-6	4-5	13-16	45-55	Emulsifiable Petroleum Wax
Cardis 319®	180-185	5-7	4-6	18-20	65-70	Emulsifiable Petroleum Wax
Cardis 320®	180-185	5-7	4-5	28-30	75-80	Emulsifiable Petroleum Wax
Cardis 262®	195-200	3-5	Brown	14-17	40-45	Specially Processed Petroleum Wax
Polymekon℗	195 MIN.	0-3	Yellow	0-0	0-0	Specially Processed Petroleum Wax
Warco BP 10	300-320	6½	Yellow	0-0	0-0	Specially Processed Petroleum Wax
Fortex®	190-200	3-5	2½-3½	0-0	0-0	Microcrystalline Hard & Plastic
Mekon® Brown	190-195	3-5	Brown-Black	0-0	0-0	Microcrystalline Hard & Brittle
Mekon® Amber	190-195	3-5	Amber 6 Max.	0-0	0-0	Microcrystalline Hard & Brittle
Mekon® Yellow	190-195	3-5	Yellow 3-3½	0-0	0-0	Microcrystalline Hard & Brittle
Warco® Wax 180 White	180-185	4-7	White	0-0	0-0	Microcrystalline Hard & Brittle
Warco® Wax 180 Brown	180-185	4-7	Brown	0-0	0-0	Microcrystalline Hard & Brittle
Warco® Wax 150-A Yellow	145-155	15-20	Yellow 1-2	0-0	0-0	Microcrystalline Plastic
Warco® Wax 150-A Brown	145-155	15-20	Brown	0-0	0-0	Microcrystalline Plastic
Warcosine®	150-155	15-20	White	0-0	0-0	Microcrystalline Plastic
Paraffin			All Grades			Crystalline
Cane Wax 500*	171-176	3 Max.	Light Brown	25-35	55-70	Vegetable Wax
Cane Wax 511*	176-180	2 Max.	Brown	60-65	0-0	Vegetable Wax
Cane Wax 517-711*	171-173	2 Max.	Black	—	—	Vegetable Wax
Cane Wax 700*	169-174	10-15	Light Brown	25-30	70-90	Vegetable Wax

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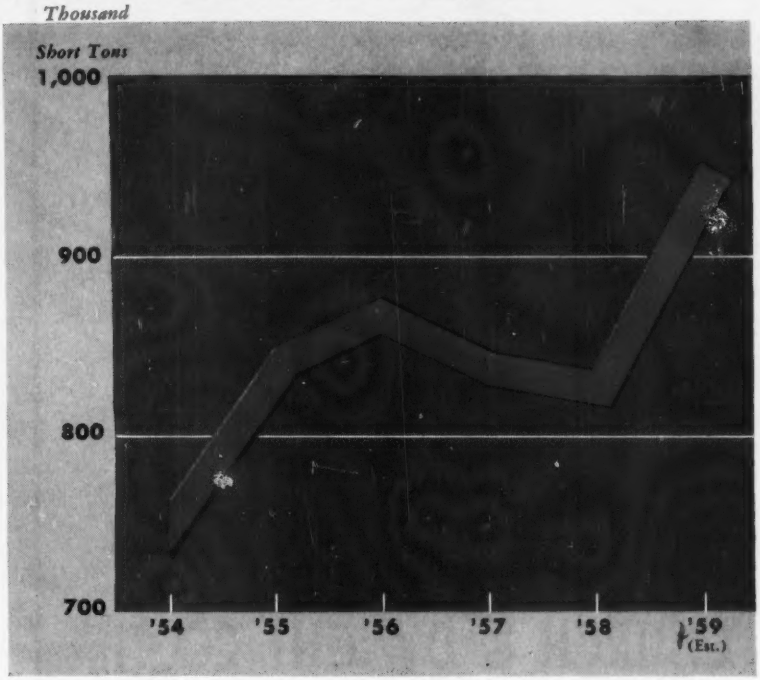
Aluminum sulfate output: rising fast



Paper and paperboard demand is helping to swell the fortunes of aluminum sulfate producers (chart, right) in '59. Outlook for '60: both continued market growth and expanded capacity.

Aluminum Sulfate: Million-ton Market Soon?

U.S. output of aluminum sulfate, the paper industry's "alum," will top 900,000 tons in '59. And spurred by increasing demands for the chemical — in paper and paperboard manufacture, water treatment and sewage treatment—two new producers have jumped into alum manufacture.

Reliable figures, pointing up the industry's progress toward a new production mark, are now available for two-thirds of '59: In the first eight months, demand (both commercial and iron-free grades) totaled 635,000 short tons, an increase of almost 15% over the same period in '58. And with prospects of continued heavy demand during the rest of '59, production will reach new records, perhaps 950,000 s.t., with a good chance of hitting 1 million s.t. in '60.

Many Bases for Optimism: For a long time, aluminum sulfate's major outlet has been the paper and pulp industry, which takes roughly 60% of all the alum produced. But water treatment and sewage treatment applications, which use 30-35% of production, are also making gains. And other smaller outlets, such as tanning, printing inks, deodorant preparations, specialty papers, etc., which use the remainder of output, seem slated for further growth.

Aluminum sulfate makers particularly have been helped by the paper industry's record in '59. Production of paper, including paperboard, will hit an all-time high in '59, should reach 34 million short tons; that's nearly 10.5% above '58's output and more than 2.5 million tons over the previous record set in '56.

Largest gains are being made by paperboard producers. Their production in the first nine months of '59 was 11,743 s.t., an increase of 13% over '58.

At the same time, paper output in the same period totaled 11,062 tons, up 11% over '58. During the remainder of '59, paper and paperboard production is expected to maintain its heavy rate, thus assuring continued high demand for paper alum.

Outlook for paper during the next few years is also bright. Increasing demands by packaging, printing and industrial users will likely boost paper product usage at an average rate of 750,000 to 1 million tons/year, to 40 million tons by '65.

Double Role: Aluminum sulfate has two main uses in the manufacture of paper — "setting" the sizing agent on the paper, and controlling the pH of the paper stock. In setting the size, the aluminum sulfate also helps to prevent the penetration of water and water-containing liquids into the paper—especially important in making printing paper (particularly for offset printing), writing and wrapping papers.

Other uses in paper manufacture: treating raw-water supply and white water for reuse; treating sewage effluent; precipitating some wax sizes and anionic wet-strength resins; fixing of basic dyes; and aiding in the retention of fiber and filler.

Rising Water Needs: Water treatment is the second-largest outlet for aluminum sulfate; sewage treatment is third. Both applications are showing steady growth. One of the big reasons: population growth.

The increasing number and size of communities concomitantly boosts the per capita water consumption. As more water is being used for sprinkling lawns, in backyard pools, for home laundry units, etc., the daily per capita water use will rise from about 150 gal. this year to around 200 gal. in '75.

Industry is also increasing its use of treated water, and this demand will rise along with industrial production gains. Treated water is used in boiler applications, in generating

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plants, some manufacturing processes, etc. (Water used in cooling and condensing is rarely treated.) And aluminum sulfate treatment of plant effluent — increasingly demanded by communities — will rise also.

Nationwide Industry: The aluminum sulfate industry is composed of many small plants throughout the U.S. Generally, they have been built near their markets — in some cases, large users of alum negotiate with suppliers to build units adjacent to the consuming plants.

According to a recent report by the U.S. Dept. of Census (Bureau of Defense Service Administration), there were 57 aluminum sulfate plants in the U.S. at the beginning of '58, with a total capacity of 1.46 million short tons/year. The largest concentration of plants (27) was in the South, a large papermaking region. These units had a total annual capacity of about 660,000 s.t. There were 14 plants in the North Central area (annual capacity 458,000 tons), and nine in the West, (151,000 tons/-year).

Louisiana, with six aluminum sulfate plants, leads other states. Ohio has five.

'Big Three': Ownership of 41 of these plants is divided among three companies: General Chemical Division of Allied Chemical; American Cyanamid; and Stauffer (Consolidated Chemical Division).

General Chemical owns the largest number of units, has 25 throughout the U.S. (and four additional Canadian plants, which are operated by Allied Chemical Canada Ltd.). GC's newest plant, at El Segundo, Calif., is reportedly now in production.

American Cyanamid has nine plants. Stauffer has six, and another under construction.

Other companies, however, are strengthening their paper alum production positions, and new firms are going after a share of the market. One of the new producers is Dixon Chemical. It is now building its first aluminum sulfate unit, adjacent to its sulfuric acid operations in Newark, N.J. Costing an estimated $1.25 million, the new facilities are rated at 40,000-s.t./year capacity, although higher output is probable.

According to Arthur Dixon, company president, construction is now about 20% complete, and startup

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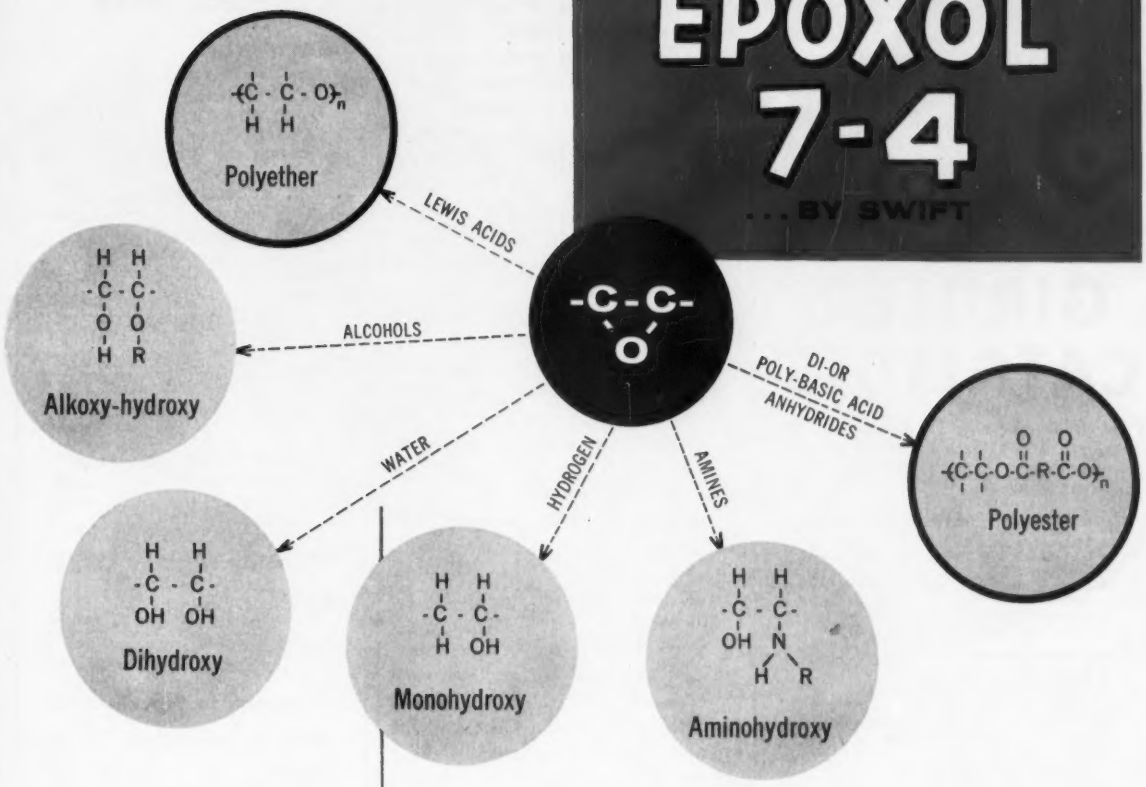

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Gardner Viscosity 25°C/25°C	0 Max. (3.4-3.7 poises)
Saponification No.	180 Max.
Acid No.	0.20 Max.
% Conversion to Oxirane Oxygen	94% Min.*
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should begin early in '60. Initial production will be the liquid material, although production of dry forms is due sometime in February.

Stauffer has also started construction of a new unit at Vernon, Cailf., expects completion in early '60. No capacity figures have been disclosed.

And on the West Coast, still another new producer has entered the field. Recently organized Associated Chemicals Co. is turning out material at its new 10,000-tons/year plant at Pomona, Calif. The company started production of liquid aluminum sulfate, will also produce solid.

Liquid Alum Trends Up: The trend in production is toward the liquid material, although dry alum is still in demand. Advantage of the liquid is sharp only when freight hauls are short. But it's preferred because it's easier to handle. The consumer simply stores the material in tanks, thus eliminates the additional personnel and expenses needed for palletizing and debagging the dry material, mixing and adjusting the concentration.

When aluminum sulfate is shipped more than 100-200 miles, economics favor the solid. Dixon Chemical, for example will be producing both grades, since some of its markets will be a considerable distance from the plant site.

Even though aluminum sulfates' main uses are tied to only two large consuming industries, the bright outlook and continued growth expected for them seem to assure growing alum markets during the next five years. This, plus the shifting of population and markets, will doubtless spur an increase in both plants and capacity.

MARKETPLACE

New Teflon Prices: Teflon TFE resin prices continue their downward trend, as Du Pont last week cut tabs on several grades. The new prices, in truckload quantities: Teflon 1, 5 and 7 molding powders, $3.60, $3.85 and $4.10/lb., respectively; Teflon 30 and 30B dispersions, $4.80/lb.; Teflon 6 extrusion compositions, $5.65/lb.

At the same time, the base price for Teflon FEP film (thicker than 2 mils) was cut almost in half, from $29/lb. to $15/lb. Other new film tabs include: 1-mil film, $16.50/lb., and ½-mil film, $20/lb.

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(Shakespeare's Macbeth. Act V, Sc. 1)

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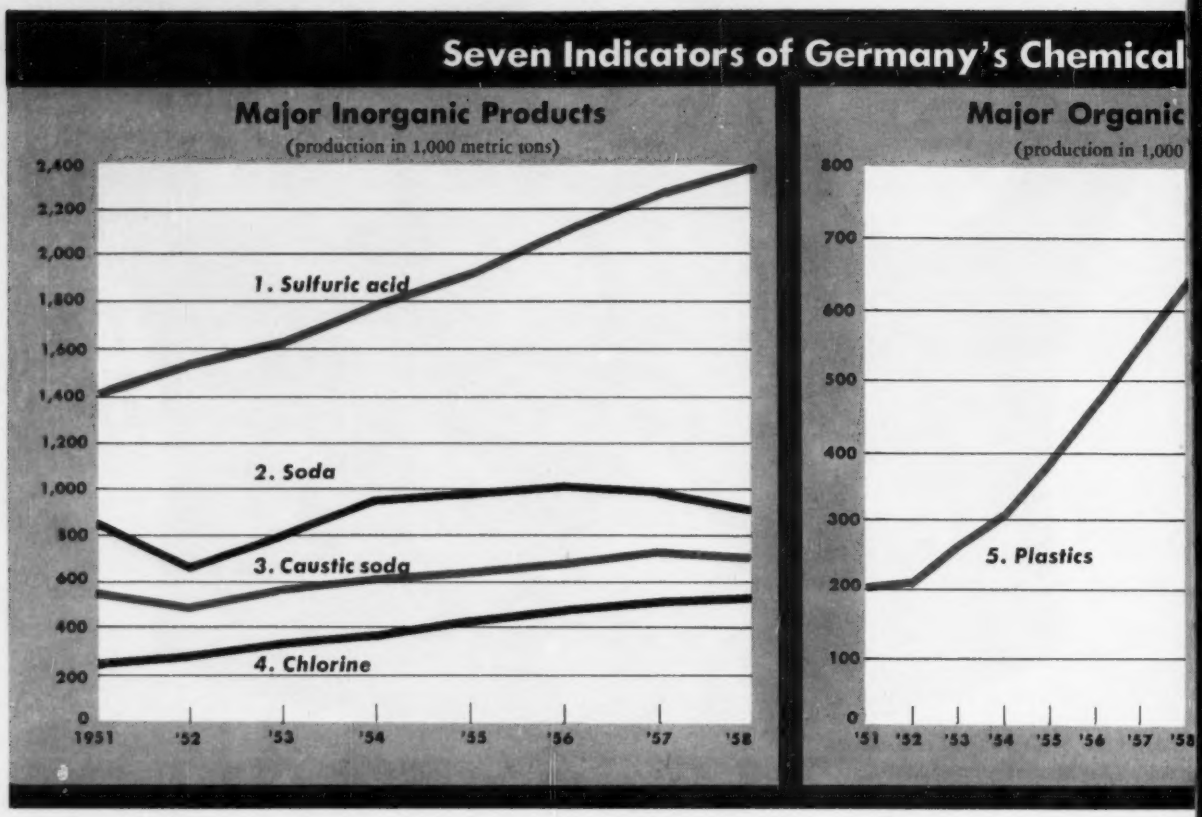


German Chemical Makers Build, Tur

New information on the powerful chemical development of postwar West Germany this week indicates soon-to-come competition for the U.S. in world markets more formidable than ever before. It also gives an inkling of forthcoming moves by German interests to enter domestic markets via capital investments here.

The rise of West Germany's chemical industry to fourth in world production and second in exports is documented for CHEMICAL WEEK in comments by Ulrich Haberland, president of West Germany's Chemical Industry Assn., and chairman of the management board of Farbenfabriken Bayer.

Germany Today: Great Britain and Germany are the leading chemical processors of western Europe. Germany is responsible for 6.7% of world production; its total chemical sales are close to $4.5 billion. Exports were up to about $1.1 billion in '58, second only to the U.S.'s $1.3 billion. Significantly, Germany now exports at least four times as much of its chemical production as does the U.S.

In the area of inorganic heavy chemicals, Haberland points particularly to the rise in production of sulfuric acid, commonly regarded as one of the best indexes of chemical production (*see chart*). It shows Germany's sulfuric output at a new high,* continuing a sharp eight-year rise.

Research Emphasis: Next year, he predicts, Germany will pour almost 5% of its net sales into an extensive research program. Development in fields relatively new to Germany will be accelerated.

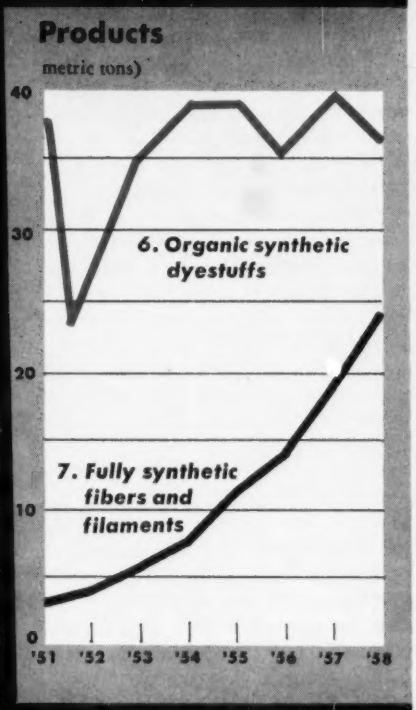
Production of older products will also be pushed. Pesticides and insecticides, based on organic phosphorus compounds, for example, are becoming an increasingly important German export and will continue so. Plastics production will increase, last year, Germany's 650,000-metric-tons production put it in second place among plastics-producing countries of the world.

Expansion of West German petrochemical industry, Haberland reports, is proceeding rapidly, although coal is still the most important raw material for the chemical industry and will probably remain so for some time. Major limits on German petrochemical production now are those on the country's petroleum industry, Haberland believes.

Information Exchange: Technical progress has made possible the manufacture of many widely used products by several different processes, Haberland says. "The result is that competition grows continuously keener, acts as an incentive to technical develop-

* In the U.S., production of sulfuric acid grew from 12.4 million short tons in '51 to 15.9 million in '58. A short ton equals about 0.907 metric tons.

Prowess



Toward U.S.

ment. When considering the chemical industries of various countries, you must remember that the considerable differences that previously existed have now largely been balanced by an international exchange of information. Today the chemical industry is dependent on this exchange of know-how and rejects any plans that might disrupt international cooperation and free trade."

This strong urge to exchange information and cooperate on an international basis is pointed up by CHEMICAL WEEK reports from Germany that in mid-October this year, top management of Germany's "Big Three" chemical firms (Bayer, Badische Anilin- & Soda-Fabrik, and Hoechst) were in America, visiting different firms and meeting different people. Aim, according to reports, was to make new contacts, feel out the U.S. business atmosphere. Most recent visitor was Badische's Carl

Continued on p. 92

BASF's Wurster: 'Just a tourist'

'Not expansion . . . a chance to learn.'

'German competition here is unlikely.'

CW PHOTOS—BD WALLOWITCH

'We welcome U.S. competition.'

The most recent visitors from German chemical companies to the U.S. this fall were from Badische Anilin- & Soda-Fabrik, and were headed by Board Chairman Carl Wurster.

Wurster assured CHEMICAL WEEK that he was making his first visit to the U.S. not primarily as head of BASF or president of the Gesellschaft Deutscher Chemiker (Germany's large association of industrial and academic chemists and engineers) —but instead simply as a tourist.

"This country is so colorful, with such a gay, friendly atmosphere," he said. "Americans say and do just as they please. It's wonderful."

Nevertheless, Wurster's six weeks' itinerary covered industrial America, included many towns noted more for their large chemical or manufacturing companies than for historical or scenic interest. Wurster cheerfully declined to say what companies he had visited, because "I got so many kind invitations that I could not accept them all."

Speaking for the German chemical industry as a whole, rather than for BASF specifically, Wurster does not expect substantial expansion of German companies into the U.S. What he does expect is a "combination of possibilities for increased learning and exchange of information." "The U.S. is so strong," he said, "German competition here is unlikely."

Petrochemicals and Plastics: Within German-American chemical combinations, Wurster predicts the greatest growth will be in petrochemicals and plastics. He cites BASF work with Dow in Texas as a good start in this direction. Aside from the Dow tie-up, BASF generally uses U.S. chemical companies for distribution here; operations are directed from sleekly modern New York offices.

Regarding Germany's expansion into Canada and Latin America, Wurster says he knows of no projects in the future. As for possible growth of U.S. chemical process companies in Germany, he says, "Investments are always being discussed. We think competition is a good thing; we welcome it."

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Wurster, who detailed for CHEMICAL WEEK some of the German-American hopes for the future (*see p. 91*).

U.S. chemical process industries management is keeping its eye on Germany at close range, too. Reports from Bonn say the plants run by the "Big Three" in Germany "fairly crawl with U.S. technicians" every day.

Eyeing Each Other: This bustling activity among management of German and U.S. chemical companies seems to hint of the day when German investments here can be unfettered from the uncertainty typified by the current tie-up of former I.G. Farben capital. Unfreezing such capital could very well result in a spate of U.S. investments by Farben descendants, including Germany's "Big Three." And a lead set by them might be quickly followed by smaller firms.

Confiscation Fear: Many Germans think that the only satisfactory way to break into the profitable U.S. market is for them to get inside the high tariff walls. But until their U.S. investments could be free of U.S. government restraints, would-be investors prefer smaller profits and limited export markets to the threat of confiscation. U.S. observers, of course, point out the past seizures were wartime measures.

Up to now, the high cost of raw materials has forced the German industry to concentrate on specialized lines, such as dyes, plastics, pharmaceuticals and synthetic fibers—most of which use inexpensive, readily available raw materials. By establishing plants or investing in going U.S. companies, the Germans hope to eventually broaden their scope of processing activity, venture into fields now predominantly the domain of U.S. manufacturers.

Teachings on Tariffs

In almost every U.S. school district this week, instructors and administrators are receiving a simple teaching aid from one segment of the chemical industry. A direct-mail item, the educational "tool" is designed to give both general industry information, and present a specific viewpoint on international trade.

The aid, latest edition of a booklet called "Allies in Defense," is the mainstay of the Synthetic Organic Chemical Manufacturers Assn.'s four-year efforts to put its message into the educational system. In no sense heavy-handed, it nevertheless gets across SOCMA's basic belief that selective tariffs on chemicals are essential to U.S. defense.

SOCMA's booklet distribution method is generally regarded as somewhat unusual. The group has chosen direct mail, long a favored approach of the advertising profession.

Outfits similar to SOCMA have tried the method before, but without success. SOCMA, however, believing it can capitalize on previous errors, is making a low-pressure offer to provide more copies of the brochure if educators would like to use it as supplementary teaching material, or as the basis of special course material.

Under its limited budget for the program—two people adminster it at a cost of less than $20,000/year—SOCMA went directly to each state for its list of schools, districts and personnel to use as a mailing list. Applying lessons learned earlier, when it rode the crest of a wave of national interest in tariffs by sending out debating material for schools (*CW, March 26, '55, p. 22*), it organized its first mailing of "Allies in Defense" in 1955, has sent out two revisions (biennially) since.

Success Measure: SOCMA figures it now has a total of about 70,000 of the booklets in circulation throughout the 1,500 colleges and 20,000 or more high school districts of the U.S. Requests for additional copies have flooded SOCMA's office since. Although most requests are in the 20-40 copy group, about 18% of the school districts have requested 50 or more extras.

LEGAL

'Fair Trade': Oklahoma City discount houses can again sell merchandise below manufacturers' recommended retail price. Temporary injunctions against the practice, sought by Upjohn Co., Olin Mathieson Chemical Corp. and Gillette, had been granted but were recently dissolved on the basis that Oklahoma's "fair trade" law is unconstitutional.

•

In the Pink: A U.S. court of appeals has upheld the right of Sterling Drug Inc. to continue to manufac-

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ADMINISTRATION

ture and sell its pink Pepsamar in competition with Norwich Pharmacal Co.'s Pepto-Bismol, which is also pink.

The opinion reversed a lower-court ruling that Sterling was guilty of unfair competition. The reversal was based on the dissimilarity of bottle, label, cap and general reaction of observers to the package, plus the citing of 33 other pink remedies for stomach upset. Said the decree: "The essential distinction in this area . . . is the difference between a deliberate attempt to deceive and a deliberate attempt to compete."

•

Radiation Action: Phillips Petroleum is charged with 19 counts of negligence in a $426,635 damage suit brought against it by two former employees of M. W. Kellogg Corp.'s Houston, Tex., laboratory. The men claim injuries from a radiation accident in which they were using radioactive iridium pellets manufactured by Phillips. They alleged that in removing the pellets from a tiny shipping canister by remote control, two of the pellets crumbled into powder, causing air contamination and subsequent radiation symptoms.

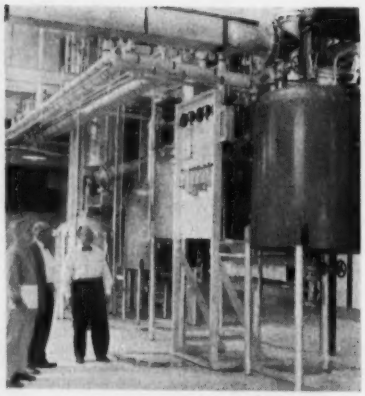
LABOR

Amoco Events: In the 23 weeks' strike of Oil, Chemical & Atomic Workers union against American Oil Co.'s Texas City, Tex., refinery, events took a new turn last week. Following a $375,000 damage suit by 18 nonunion employees, charging that union pickets allegedly prevented them from working, one of the 18 allegedly admitted he joined in the suit because union officials wanted him to act as a union informant.

The 18 men have returned to work under police escort. Negotiations scheduled last week were broken off, and a federal mediator has postponed them "indefinitely."

•

Hike Without Contract: At Bartow, Fla., employees of Virginia-Carolina Chemical Corp. received a 1¢/hour wage increase, although negotiations on a new contract with the International Chemical Workers Union are still going on. The plant was closed down last summer by a bitter 73-day strike; and since its reopening, employees have received a



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ADMINISTRATION

total of 11¢/hour in wage increases. The old contract expired May 15.

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Monsanto Switch: At Texas City, Tex., Monsanto Chemical Co. has extended its contract until '61 with the Metal Trades Council, AFL-CIO, even though its old contract would not have expired until March '60. Agreement calls for an immediate 3¢/hour wage increase and 8¢ in March.

•

Stauffer Strike: A three-pronged strike of employees at Stauffer Chemical Co.'s Louisville, Ky., plant has forced supervisors to operate the plant. The strike followed expiration of 28-month contracts with the International Chemical Workers Union, the Plumbers and Pipefitters, and the International Assn. of Machinists. Unions are asking 27¢/hour increases. About 90 of Stauffer's 100 employees are members of the unions.

KEY CHANGES

Eugene B. Hotchkiss to executive vice-president, Vitro Minerals Corp. and **Raymond T. Ruder** to vice-president, finance, of parent company, Vitro Corp. of America (New York).

W. D. Henderson, Jr. to vice-president, operations and systems, Thompson Chemicals Corp. (St. Louis).

Alex S. Chamberlain to president, Louisville Refining Co.; **Robert E. Yancey** and **Orin E. Atkins** to administrative vice-presidents of parent company, Ashland Oil & Refining Co. (Ashland, Ky.).

T. M. Welton to vice-president, marketing, and board of directors, Oronite Chemical Co., and **Leroy C. Kennedy** to vice-president and director, Ortho Agricultural Chemicals, Ltd., Canadian subsidiary of California Spray-Chemical Corp., both subsidiaries of Standard Oil Co. of California (Richmond, Calif.).

DIED

Walter J. Murphy, 60, editorial director, applied journals, American Chemical Society, at Washington, D.C.

John A. Chew, 75, president, John A. Chew, Inc. (New York), chemical distributor.

Horace Ivan Cate, 49, owner, Arkansas Chemical and Supply Co., at Little Rock.

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Bakelite BR-9432 Resin (Phenol-Formaldehyde) (Orig. Bbls.) $.33/lb. Barium Hydrox. N.F. (J.T. Baker Orig.) 15 Leverpaks $.06/lb. Lacquer Thinner, Off Color $.25/gal. (Bulk). Triethylene Glycol Dicaprylate 10 drums $.18/lb. 30% Phthalic-70% Soya 10 drums $.12/lb. Toluol 10,000 gals. $.20/gal. Aluminum Paste (suitable for roof coating) $.20/lb. Type "S" Anti-Freeze $.39/gal. (in drums). 30,000 lbs. Dibutyl Sebacate, Bulk $.35/lb. 2 orig. drs. Polyethylene Gly. 1000, Monostearate $.20/lb. 3 orig. drs. Barrett Pyridine 15A $.35/lb. O/S 2000 gls mixed Phthalate-Phosphate Plasticizer 20¢ lb. O/S 500 gls TCP Plasticizer 20¢ lb. 3 drs-Isoprene—Enjay virgin 15¢. FS-3184, Chemical Week.

Patterson 6' x 8' Porox Lined Pebble Mill, porcelain pebbles, 50 HP Motor. Perry Equipment Corp., 1415 N. Sixth St., Philadelphia 22, Pa.

Lithium Bromide—Cyclopentyl Bromide Write or phone: Mr. R. S. Henly, Applied Science Laboratories, Inc., 140 North Barnard Street, State College, Pa. Phone: ADams 8-0221.

CHEMICALS WANTED

Surplus and dead inventory wanted. We pay top dollar for unwanted chemicals and chemical products, waxes, spent catalysts, metal sludges, wasted solvents and gas cylinders. Industrial By-Products & Surplus Co., 40-40 Lawrence Street, Flushing 54, New York, INdependence 1-4100.

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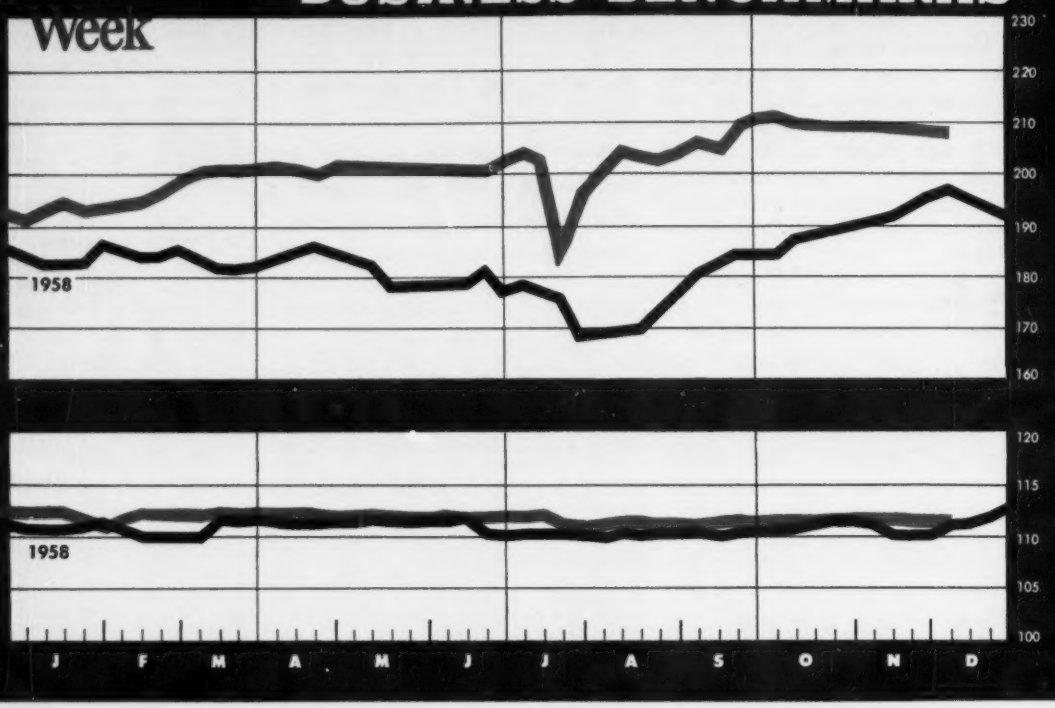
To Employers Who Advertise for Men: The letters you receive in answer to your advertisements are submitted by each of the applicants with the hope of securing the position offered. When there are many applicants it frequently happens that the only letters acknowledged are those of promising candidates. (Others do not receive the slightest indication that their letters have even been received, much less given any consideraion.) These men often become discouraged, will not respond to future advertisements and sometimes even question if they are bona fide. We can guarantee that Every Advertisement Printed Is Duly Authorized. Now won't you help keep our readers interested in this advertising by acknowledging every application received, even if you only return the letters of unsuccessful applicants to them marked say, "Position filled, thank you." If you don't care to reveal your identity, mail them in plain envelopes. We suggest this in a spirit of helpful co-operation between employers and the men replying to Positions Vacant advertisements. Classified Advertising Division, McGraw-Hill Publishing Company. "Put Yourself in the Place of the Other Fellow."

BUSINESS BENCHMARKS



DECEMBER 5, 1959

WEEKLY BUSINESS INDICATORS	*Latest Week*	*Preceding Week*	*Year Ago*
Chemical Week output index (1947-1949=100)	210.0	208.4	195.0
Chemical Week wholesale price index (1947=100)	110.9	110.9	112.2
Stock price index (12 firms, Standard & Poor's)	58.40	58.22	46.47
Steel ingot output (thousand tons)	2,495	2,233	1,988
Electric power (million kilowatt-hours)	13,812	13,270	12,579
Crude oil and condensate (daily av., thousand bbls.)	6,935	6,876	6,975

PRODUCTION INDICATORS (1947-1949 = 100)	*Latest Month*	*Preceding Month*	*Year Ago*
All manufacturing	151	152	140
Nondurable goods manufacturing	146	147	134
Durable goods manufacturing	157	158	146
Chemicals and allied products	216	217	189
Industrial chemicals	253	253	209
Petroleum and coal products	131	132	137

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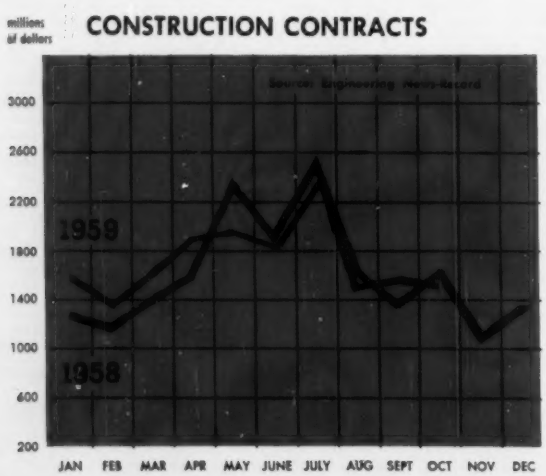

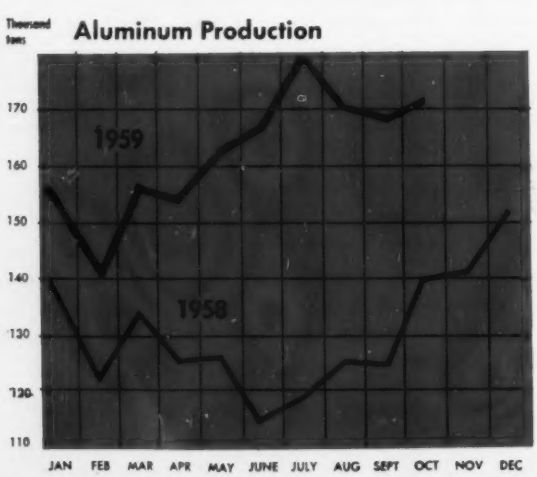

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- **Flatting agent** — varnishes, lacquers, organosols, plastisols
- **Reinforcing agent** — rubber, silicone, latex film
- **Anticaking agent** — sulfur, insecticides
- **Antislip agent**—solvent-base floor waxes
- **Precoating material** — reproduction paper
- **Low temperature thermal insulation**
- **Pharmaceuticals and cosmetics** — **(See bulletin #cpha-1)**

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( ) Cab-o-sil in Dipped Latex Films (#crub-3)
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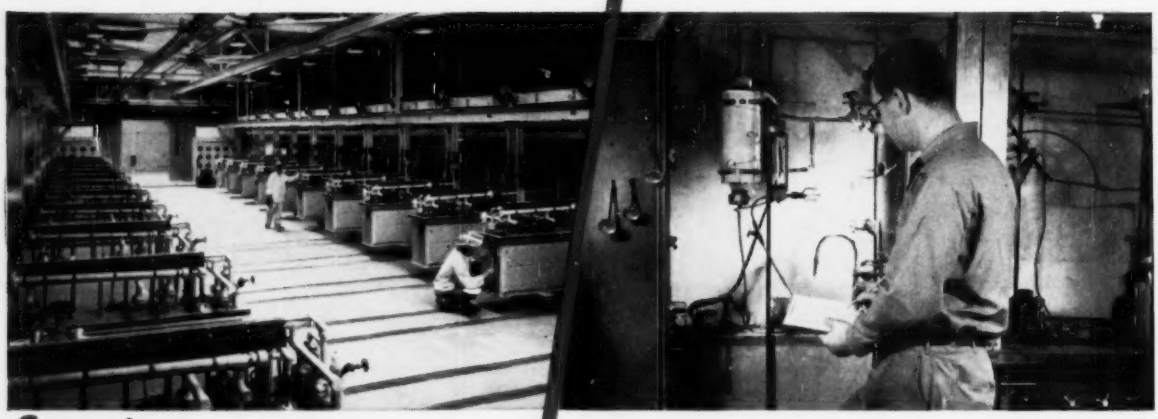

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